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ABSTRACT

A descriptive analysis of 38 studies from the early to mid-1970's evaluating the effectiveness of career education (CE) programs focused on student (K-12 grade levels) achievement of competence in the basic academic skills (primarily mathematics, reading, and language arts). The studies reviewed were conducted nationwide using a variety of research designs, instruments, sample sizes, and statistical analysis approaches. The findings were (1) generally supportive of CE in 19 studies where reading and/or mathematics were impacted at various levels of significance and in one study reporting that the treatment students maintained growth in the basic skills; (2) moderately supportive of CE in 16 studies showing reading and/or mathematics grade equivalent score improvement and achievement gains; and (3) unsupportive of CE in 3 studies revealing either negligible or minimal impact. Although few generalizations could be made, it was noted that (1) a few more citations of positive results were itemized for reading than for mathematics or total language; (2) most of the successful studies collected data over one academic year; (3) the more intensive CE treatments led to more positive results; and (4) with few exceptions, CE had few adverse effects. Data charts are appended summarizing information from the 38 studies in several areas: Subject, location, research design, instruments, sample size, grade level, statistical analysis, delimitations, CE treatment, type of study, findings, conclusions, researcher, and institutional source of the report. (EM)

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# CAREER EDUCATION AND BASIC ACADEMIC ACHIEVEMENT

## - A DESCRIPTIVE ANALYSIS OF THE RESEARCH -

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May 1977

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CE 011 316

TABLE OF CONTENTS


page

I. The Issue . . . . . 1

II. The Findings . . . . . 20

III. The Conclusions . . . . . 46

Data Charts . . . . . 61

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## I. THE ISSUE

Goal #1. In the policy paper of the Office of Career Education (1974), nine learner outcomes were established--a tenth was added later. Originally they were presented in this context:

> For purposes of forming a broad basis for evaluating the effectiveness of career education efforts, a listing of developmental outcome goals is essential. In this sense, career education seeks to produce individuals who, when they leave school (at any age or at any level), are: (1) Competent in the basic academic skills required for adaptability in our rapidly-changing society.[16] (Emphasis added)

Other goals dealt with such outcomes as... good work habits... work values... decision-making, job-hunting, and job-getting skills... occupational and interpersonal skills... self-understanding and understanding of educational-vocational opportunities... success in placement in a paid occupation, education, or vocation... seeking to find meaning and meaningfulness through work in productive use of leisure time... awareness of means available for changing career options.[16]

None of these outcomes are unimportant. In fact, for understanding the impact of career education (CE), all must be looked at concurrently. While goal #1 was isolated for the purpose of this analysis, it is essential to view them in context with one another. They cannot easily be separated. However, as the recent national survey on CE pointed out, among the learner outcomes indicated, the one clearly perceived in the field as the most important was the teaching of basic skills.[27]

What others have said about CE evaluation. It is not that this analysis needs a whole lot of additional justification. We have to look at learner outcomes if we wish to assess the effectiveness of CE; if we look at learner outcomes, we have to look at basic academic skills. But, to be sure, what others have thought about this issue is essential for understanding not only the impact but the nature of CE.

We begin, therefore, by citing a U.S. General Accounting Office report[6] which recognized that "Before State and local educational agencies can consider career education curriculums, they must know... the expected effect on students." Review by the GAO of some of the early projects provided inconclusive results regarding impact. (These were the projects funded under authority contained in the Vocational Education Amendments of 1968, The Cooperative Research Act, and the Education Amendments of 1972.) GAO found that evaluations were hindered by the lack of adequate measures and by difficulties with specific test instruments. However, it concluded that some evaluations, "though subject to the limitations in the art of measurement, have shown a favorable impact."

Another early report (1974 is relatively early in the life of CE), summed up the evaluation problems:

> As with any proposed educational program, the question 'does it make any difference in student learning?' must be addressed. In the case of career education this question has not been adequately addressed to date. Part of the reason lies in the newness of career education programs. Another reason is that many of the outcomes of career

> education are long range... and thus cannot yet be measured. A third problem is that instruments of sufficient validity and reliability do not exist in many of the areas which career education addresses. Finally, evaluation is expensive and requires considerable expertise.[7]

In the case of basic academic achievement, it is clear to see that some of these points apply. This type of evaluation is expensive, it does require considerable expertise, and it does raise a validity question. Further, the question of the relationship between the infusion of CE into the curriculum and basic academic achievement is a legitimate area of concern.

Dr. Hoyt's position. Kenneth Hoyt, director of the Office of Career Education, has considered this relationship in a number of articles and speeches. He has stressed the importance of Goal #1 for a number of reasons, including these: employers complain that youthful job applicants are often deficient in such skills; most persons will be forced to change occupations several times during their adult lives and need basic skills as a prerequisite for doing so; many pupils apparently are not sufficiently motivated to acquire these essential skills.[21]

Although obviously many opportunities to learn and use basic academic skills exist between elementary school and the time one applies for or changes a job, Hoyt is correct in reminding us that the foundations are set early in one's school life. He also identified two broad approaches for increasing achievement at the elementary school level: show pupils

how adults need and use such skills and increase the variety of means and settings for use in helping pupils acquire these skills.[21]

Evaluation of academic achievement is of highest priority to Hoyt, as he has stressed clearly and unequivocally:

> Unless career education can demonstrate that, when applied, pupils in elementary schools increase their levels of academic achievement in the basic skills, it will have trouble justifying itself long enough to be concerned about the remaining criteria.[21]

And again:

> ...career education should not be afraid to use traditional evaluative criteria--including increases in pupil achievement, in pupil attendance, and in school-holding power. Of these, demonstrations of the ability of a career education approach to increase pupil achievement in the basic academic skills is, by far, the most crucial. While preliminary evidence available suggests that career education can have such an effect, this evidence is, at present, far too sparse and too susceptible to criticism for us to claim that career education, if properly applied, <u>will</u> produce such results. With the current strong national push toward a 'back to basics' emphasis, it seems to me especially crucial that comprehensive career education efforts demonstrate that, in fact, they can serve as an effective vehicle for improving basic academic achievement. I am not afraid to use this criterion providing a truly comprehensive career education effort is being applied. I am very fearful of using it with some of the efforts now being called 'career education' that exist in many schools.[20]

In response to the argument that more rigorous standards--and not CE--is the way to raise achievement, Hoyt has stated that CE "would answer this objection by pointing out that... advocates have claimed this is to be one approach to increasing student achievement but never the only possible approach."[18]

In a recent analysis, Hoyt has developed a number of concepts further relating to the question of whether or not CE is willing to be evaluated--in part at least--on the basis of its demonstrated ability to improve academic achievement. He has stated that "If that question is answered affirmatively, then it is obvious that the primary implementation focus must be oriented around the teaching/learning process with the substance of "careers" being used as a vehicle for doing so."[17] Hoyt then discussed four generic kinds of changes:

> ...(a) a sense of purposefulness, (b) rewards for accomplishments, (c) increasing variety, and (d) full utilization of all available resources--are ones that have been shown to increase industrial productivity. There is every reason to believe that they can also be used to increase educational productivity--i.e., academic achievement. Unless we can demonstrate that a career education approach improves academic achievement, career education will fail as a reform effort. The teaching/learning process, not the substance of careers, is the basic ingredient in improving academic achievement.
>
> The basic issues... is whether or not increases in academic achievement represent a reasonable criterion for use in evaluating the effects of career education. If it is, then curriculum/instruction

> specialists become fully as important as career development specialists in implementing career education. If it is not, then career education is merely an extension of career development, not an educational reform movement. As we move from conceptualization to implementation, this issue must be faced and resolved.[17]

Elsewhere, Hoyt has suggested that each of the changes mentioned above is designed to help improve academic achievement and that "none is, in any way, counterproductive to attainment of any of the basic goals of American education."[22]

Lastly, on whether CE takes time away from teaching the basic academic skills, Hoyt has responded: "Career education, far from being opposed to the 'back to basics' movement, can and is serving as an effective vehicle for assuring that students acquire such skills. The changes in the teaching/learning process advocated by career education are each designed to increase academic achievement, not to interfere with this goal."[22]

The evaluation mini-conferences. Between September 1975 and May 1976, 27 mini-conferences were conducted on nearly every conceivable phase of CE. The two which dealt with evaluation offered a number of insights into the issues of Goal #1. A detailed summary of these conferences has been presented by Hoyt.[19] Since many of the discussion points have great relevance, they are reported below in some detail:

(1) Since CE assumes efforts which begin in the early elementary school and continue through the entire system, the attainment and measurement

of long-run goals must necessarily be delayed for a number of years. This accentuates the importance of both process and short-term product goals.

(2) There was diversity of opinion among conferees as to what would be considered acceptable measures to determine the extent to which students have acquired such skills.

(3) Many current attempts at evaluation have concentrated their primary attention on "Step c"--assessing the benefits that result from application of the treatment, while almost completely ignoring "a and b," i.e., specifying clearly the treatment to be applied and verifying the extent to which it has been.

(4) On evaluating implementation of a concept: If CE continues to be viewed as a concept which, when applies in action, can lead to both educational reform and to a series of direct student benefits, we will continue to be in a position where the total success of the effort can be evaluated, but great difficulty will be encountered when either praise or blame is to be assigned to a particular segment. Evaluation would be much easier if CE were a program, but it is not.

(5) On evaluative criteria: Because CE seeks to be infused into all programs rather than added on as a separate one, because it does not seek new kinds of specialists at the building level, and because it does not ask for large amounts of dollars, its long-run future may, operationally, depend relatively more on personalized, informal criteria than the more formal evaluation efforts based strictly on either process or product.

(6) Additional points on Goal #1: (a) A clear majority, but not all, of the conferees considered this to be a reasonable goal. In the view of the Office of Career Education, this is the single most important goal for CE, as a vehicle for educational reform. A proposal for educational reform that ignores this cannot, in the Office of Career Education's opinion, be justified.

(b) While most of the participants agreed on the appropriateness of this learner outcome goal, they disagreed on the kind of measures appropriate for use in measuring progress toward it. In the first of the mini-conferences, consensus seemed to exist that norm-referenced tests are what the general public wants and, thus, what should be used. A significant minority, however, argued strongly for use of criterion-referenced achievement tests. General agreement was present that norm-referenced tests have serious limitations and probably will be replaced with other approaches to measuring academic achievement, but most felt them to be more appropriate than criterion-referenced tests at the present time.

(c) In the second mini-conference, discussion centered around the potential which newer approaches to measuring functional literacy have for assessing this learner outcome. A general consensus seemed to exist that, while standardized norm-referenced tests may be suitable for use in assessing this outcome for elementary school pupils, a measure of functional literacy would be preferable at the junior and senior high school levels.

(d) In the view of the Office of Career Education, the use of norm-referenced tests are appropriate, at this time, for use at both the elementary and secondary school levels in assessing this goal. In addition, at the secondary school level, use of some kind of functional literacy measure should be encouraged. Use of such measures, as a replacement for norm-referenced tests at the secondary school level, will become possible only when academic teachers at that level accept such measures as valid indicators of what they are teaching. It appears that this will not happen in the immediate future.

The monograph concluded with reiteration of the idea that "Product evaluation, based on a clearly defined set of learner outcome goals, will be essential in assessing the extent to which the career education effort is providing direct benefits to students."

What others have found. There have been other analyses of CE in relation to academic achievement. For example, as part of a study commissioned by the National Advisory Council for Career Education, Rita Bryant reviewed 70 studies including several indirectly related to the topic (i.e., those with factors regarded as contributing to academic achievement, such as self-esteem, self concepts, and motivation). Bryant's conclusion seemed to be that:

> Indications are that the evaluations of many 1975-76 programs may contribute substantially to the knowledge now available concerning the interrelationship of career education and academic achievement. Soft data have indicated that positive changes in the self concepts

> and work habits of some students have taken place. Follow-up studies, indeed, may net more hard data that career education can aid the development of students' acquisition of the fundamental skills--reading, writing, and arithmetic.[3]

Thomas Enderlein, as a 1975-76 Fellow in the Office of Career Education, also reviewed a number of studies which dealt with several aspects of CE. He included a brief analysis of 13 studies on academic achievement, many of which were cited by Bryant. Enderlein's conclusion:

> Perhaps the most encouraging findings were reported in those aspects of the evaluations which focused upon basic academic skill development. Where the career education concept is infused into existing curricula, it appears that this infusion process positively relates to academic growth.[12]

Robert Worthington, in another study commissioned for the National Advisory Council for Career Education, reviewed 49 doctoral dissertations relating to various aspects of CE. Of that number, he reported that none placed emphasis on the specific learner outcome of basic academic achievement.[37]

There obviously have not been many studies relating CE to academic skills. This was also a conclusion of the Development Associates in their evaluation of vocational exemplary projects and guide for evaluating CE. Of 20 reports analyzed in 1975, only one addressed itself--in part--to academic competence.[13]

Some of the initial articles in this area offered sketchy information which, while supportive of CE, can not be classified as comprehensive research. One item to which several writers refer is a study by Purcell. Hoyt

has reported on it: "...when the reading ability of 2nd graders from a class emphasizing CE approaches was compared to that of 2nd graders not involved in such an approach, the reading scores on the Cooperative Primary Reading Test were significantly higher, in a statistical sense, in the class using a CE approach..." [21] The original source, a project newsletter, contained the following note: "These are only preliminary findings, but they seem to support the contention that CE treatment, or at least the novelty of the treatment, is having some positive effect on students."[21]

In Dade County, Florida, a 1974 letter from Superintendent Whigham to Dr. Hoyt provided data on results obtained from efforts to use a CE approach to teaching math. Comparing gain scores from data collected in 1973 and 1974, Whigham reported mean gains (grade equivalent) for 4th graders at +1.96, 5th graders at +1.52, and 6th graders at +1.30. Hoyt also noted that conversations with school personnel made these gains seem even more impressive when they related that among other inner-city elementary schools, the average mean gain in math for the year was less than .50 (grade equivalent).[21]

More recently, four FY '75 projects of the Office of Career Education touched upon the relationship between CE and academic achievement. Those with "hard data" are included in this analysis, but two observations also are reported for two other projects:

- Evidence in relation to Goal #1 is found in a report submitted by the Indiana State Department of Public Instruction (USOE Grant No. G007502396). The document reports, among other activities, a program developed by the Lakeland School Corporation. The program

was provided to approximately 40 eleventh graders who exhibited hard core reading problems. All of them had histories of repeated failures and the expected concurrent negative attitudes toward anything 'academic.' A teacher and an aide were able to achieve dramatic reversals in attitudes and skill increases by using a variety of career-related approaches, guest speakers and informational filmstrips. The results were so encouraging that the school board maintained the program as a continuing activity supported entirely with local funds.[14]

- In Rockford, Illinois (USOE Grant No. G007502397) teacher interviews were conducted with questions on listening, speaking, reading and writing skills, and on arithmetic operations, problem solving and measurements skills. The design included a control group of teachers not involved with CE and an experimental group who infused CE only in language arts and measurement in math. Almost all cases of teachers observed increases in communication skills occurred in classrooms with high infusion. Teachers reported that integration of CE concepts had a definite impact on achievement in communication skills, especially writing. Marked improvements were noted in form, content, organization, and clarity of written material and vocabulary. The greatest improvement was found in poor or remedial students. Improvement also was noted in reading habits and interests, attributed to new interest sparked by career exploration. Little improvement difference was found between experimental and control groups in math skills, except in the area of measurement, which was the only math skill in which CE activities were integrated.[32]

What others have felt. The purpose of this analysis is obviously not to dwell on what educators and laymen feel about CE. It is important to note, however, fear on the part of some who claim that CE will adversely affect the teaching--and learning--of basic academic skills. On the other hand, there is an ample support for CE and what it can do for basic skills--if properly implemented.

The Council for Basic Education, while not having a formal position, has commented with some frequency ever since "This new form of enlightenment was given a place on the list of education schools are expected to provide." Although they have "never voiced unalterable opposition," they consider themselves "doughty skeptics" and have been extremely candid in expressing misgivings about the aims in CE. The Council believes "...that it is appropriate for the schools to take some responsibility for acquainting students with the 'world of work.' How much is a question, however. Certainly not so much that it takes precedence over responsibility for basic education. We suspect that sometimes, if not often, basic education is the loser."[10]

The Council of Chief State School Officers' position lists the steps which it believes should provide learners with opportunities to acquire among other things, "the basic skills essential to all other learning." The statement goes on to say that the CCSSO believes that CE will provide a vehicle which can lead to the accomplishment of this purpose.[5]

The National Education Association in its official 1976 resolution supported CE but did not specifically address the issue of academic skills.[29] The

American Federation of Teachers in its 1976 resolution stated that it recognized "the potential misdirection of some well intentioned education and work programs."[24] However, while neither AFT's resolution nor its Task Force paper addressed the issue of academic skills, its Congressional testimony raised the issue when discussing declining standardized achievement test scores:

> While there is no evidence to indicate specifically or conclusively that career education programs are even partly responsible for this, it seems more than simply coincidence that emphasis on career education as well as other non-traditional curricular areas is rising while achievement test scores are falling.
>
> Assuming that tests are measuring what we want them to measure, and assuming that English and math should and will continue to be basic elements in any solid curricula, we think this committee may want to address itself to the very real question of whether career education programs supplement or substitute for basic curriculum.[23]

Another labor union, the United Auto Workers, took a position which in some respects paralleled the CCSSO in that it listed a number of major educational problems, including the "failure of students to acquire and possess vocational, technical and academic skills," and then went on to state that "career education, properly implemented, addresses itself to correction of these problems."[36]

Some researchers' notes on CE evaluation and related concerns.

(1) Gordon Cook and others: In any situation involving evaluation, there

are usually at least two schools of thought. One focuses on precision and proof--hard data--while the other concentrates on self-actualization and the free play of natural forces.[8]

(2) Young and Schuh: Generally speaking, it is preferable to select the design which permits answering each evaluation question with the greatest possible confidence. Since the most confidence can be placed on answers based on the research designs of controlled experiments, if it is necessary to 'prove' something (e.g., that career education increases reading achievement scores), then true experiments (with control groups) are necessary. Although there are several 'true' experimental designs which can be used, a major problem in the design of education program evaluations occurs when the requirements of these 'true' designs cannot be met. In a school setting, the most troublesome requirement is to randomly assign students to program activities (treatments).[38]

(3) McCaslin and Lave: On standardized tests:

| Advantages - | Disadvantages - |
|---|---|
| Data are quantifiable and can be easily compared over time, for on-going assessments; data can be related to goals or objectives; groups of students may be compared.[26] | Norms may not be appropriate for a given population; tests may be inappropriate for the goals used; if too much reliance on test, other data and values may be overlooked; usually reflects only cognitive achievement.[26] |

(4) Lucas: Let there be no doubt about it, evaluating the impact of career education on student behavior is a difficult and expensive job... By looking at the percentage of available instructional time spent on career-related activities, one can better anticipate the magnitude of student

behavior changes. If only a small percentage of instructional time is spent on careers, could one expect large changes in student behavior? Not likely, and in this case the failure to find significant changes in student behavior would not indicate the ineffectiveness of a program's components. It would only indicate a failure of the delivery of program components. (Emphasis added) For a product evaluation to have meaning, one must be sure that the program was delivered as planned. Therefore, the prerequisite for a valid product evaluation is a solid process evaluation which quantifies program delivery.

To increase the probability of a positive product evaluation, one should make sure that the program is delivered with adequate force to students in the target population.

This recommendation presents a dilemma, because one of the best ways to turn off a teacher is to impose on him/her a new concept (like career education), new teaching methods, and require that he/she devote a major portion of their instructional time in these activities before the teacher has been convinced of the value of the new program....by forcing teachers into something they have not had time to study and accept or by not maintaining tight administrative control over program delivery, positive product evaluations are not likely.

The solution to this dilemma is to delay product evaluation of career education programs until teachers and administrators have been convinced of its value and are willing, able, and do implement the experimental program to its fullest degree. This takes years![25]

(5) Lucas, again: Another shortcoming (for program evaluation purposes) of many commercially available tests, and this is particularly true of standardized achievement tests, is that they are norm-referenced tests. According to Popham: 'There are, indeed, a number of situations in which norm-referenced tests (particularly if their cultural bias problems are cleaned up) can prove very serviceable. Evaluating the quality of an educational program is not one of those instances....After several revisions, in fact, a standardized achievement test looks and functions very much like a standardized intelligence test. Such tests are relatively insensitive to instruction.' Because of the relative insensitivity of these tests, changes in student behavior resulting from a career education program may not be discovered.[25]

Notes on how this analysis proceeded.

(1) On the Data Chart I used, for the most part, the exact language of the researcher so that the reader would have the precise flavor of the report rather than a second-hand interpretation. My own comments in that section have been kept to a minimum and are indicated by the use of brackets.

(2) I have attempted to write for the laymen (i.e., most of us) rather than for practicing researchers. The Data Chart, however, includes a column on statistical analysis and addresses indicating where the report can be secured for those who wish to search further into the raw data.

(3) I have used the primary resources in all cases. The original reports were received from various resources. An ERIC search conducted

by the NIE assisted in the identification of sources. No material was incorporated second-hand into the Data Chart unless indicated. (Unfortunately, obvious restraints prevented me from reviewing the data at the direct source--in the field--which would have been highly desirable. For more detailed reporting, future analysis should attempt to study the data at the site, particularly data on CE treatment. A case study approach which would look at basic academic achievement in the context of all of the other learner outcomes also is highly recommended.)

(4) A total of 38 studies--from the early to mid-1970's--are included in this analysis.

(5) The previous descriptive analyses of research in this area seemingly gave equal weight to the scope of the studies and often failed to provide sufficient information (e.g., on the instruments used, size of sample, treatment, interpretations, etc.). The format here, hopefully, allows readers to see for themselves the dimensions of each project and to draw their own conclusions.

(6) Much of the data in the reports dealt with many other learner outcomes. However, for the purpose of this analysis, the focus was narrowed. (Nevertheless, for complete understanding of CE impact--and it is sizeable--it is essential to study the reports in their entirety. Basic academic skills are just one of the learner outcomes and, as indicated, must be viewed in context with all of the others.)

(7) Research along these lines appears to be in its infancy. The situation in this area is fluid, i.e., undoubtedly there are additional

data available "out there." Probably many local studies exist which report information on the basic skills. (We would, therefore, be most grateful if you would send your reports to the Office of Career Education--to the attention of the Deputy Director.)

## II. THE FINDINGS

Five general observations.

(1) With the acknowledged diversity of the concept, it was not surprising to discover that there did not appear to be a common operational definition of the term, career education.

(2) Many problems in CE evaluation have been identified. Those cited above were clearly evident to this observer: long-range objectives are often difficult to measure, evaluation does require considerable expertise, and experimental designs are often difficult to maintain in public school settings.

(3) Unfortunately, detailed CE treatment was not always clearly stated; it was not always possible to ascertain the degree of "delivery of program components."

(4) The scope of these studies varied greatly--from the assessment of one teacher to the comprehensive reports of the R and D labs.

(5) The quality of the reports also varied. By and large, the studies speak for themselves. Some say much; others say very little. A few studies were poorly designed; a few reports were poorly written.

Subject matter focus. The majority of the studies focused on mathematics (28 studies) and/or reading (23). However, data also was reported on language arts (14)--including spelling, vocabulary, "English," and oral

and written communication, studies skills (4), social studies (3), and science (2). The subject matter focus of several studies (6) were unspecified.

Project locations. The studies were conducted nationwide: in the Northeastern States (17 studies), Southern States (8), mid-Western States (9), and far-Western States (4). However, some of the studies of the R and D labs covered several sites, e.g., one of the studies of the Northwest Regional Educational Laboratory had pilot sites in Oregon, Washington, Montana, and Alaska and one of the studies of the Appalachia Educational Laboratory had implementation sites in Georgia, Louisiana, Iowa, and New York.

Research designs. Procedures varied greatly. The use of pre-tests and post-tests were indicated in the majority of the studies (25); the use of control groups were indicated to the lesser degree (13). Three studies specified utilization of a true experimental design (Gibboney, the RBS--9/26/75, and Biester); three indicated a quasi-experimental design (Olson, Omvig '76, Kershner and Blair); three cited the specific research design indicated by Campbell and Stanley (Olson, Bryant, Omvig '74). Other studies indicated the following approaches: the use of comparison groups, treated and untreated comparisons, comparisons of norm-reference test data, the use of achievement tests over an extended period (as well as shorter periods), the comparison of CE to pre-CE classes, and the comparison of test scores from one year to the next.

Instruments. The most widely used standardized test was the Comprehensive Test of Basic Skills (14). Other tests used to a lesser degree were the

Metropolitan Achievement Test (4), The Stanford Achievement (4), the Iowa Test of Basic Skills (3) and the Iowa Test of Educational Development (3). In addition, a number of other tests were used (13) as well as several criterion-referenced measures (4). One study did not specify the instrument.

Size of sample. It would be meaningless to cite the average number of students involved in these studies or to generalize here, except to say that there was great variability. The range numbered from as few as five to as many of several hundred. The majority of the studies specified the numbers in the experimental and control groups, while others simply reported the total amount of students involved in the program, or students tested, or the number per group per grade. By and large, the figures appeared to be significantly large.

Grade levels. In some cases the reports indicated that the range was from grades 1 to 6, 2 to 6, 1 to 9, 2 to 11, or, in two cases, K to 12. To give some idea of the scope, the following frequency distribution is given--in which citations were made for each grade when a range was indicated:

| (level) | (# of studies) | (level) | (# of studies) |
|---|---|---|---|
| K | 3 | G7 | 10 |
| G1 | 6 | G8 | 14 |
| G2 | 9 | G9 | 13 |
| G3 | 14 | G10 | 12 |
| G4 | 13 | G11 | 16 |
| G5 | 10 | G12 | 11 |
| G6 | 13 | Adult | 1 |

Statistical analysis. A variety of approaches were specified, e.g., univariate and multivariate analyses of variance, analysis of covariance,

t-test, F-ratios, significance levels (P), regression analyses, standard deviations, reliability coefficient, chi-square procedures, parametric statistical techniques, and criterion-referenced test. However, since this analysis is written for the layman rather than the practicing researchers, we have made, with one exception, no attempt to define the terms. Instead we direct the reader to standard texts on evaluation and measurement (such as the ones we utilized by Robert Ebel[11] and Scarvia Anderson and others,[2] which explain the statistical approaches identified). The one exception is criterion-reference measurement, for which Anderson and her colleagues stated the following, by way of definition: "...students scores ...are interpreted in terms of rationally or empirically established standards of attainment rather than in terms of the performance of some reference group of people." As we noted, criterion-referenced measures were used in four of the studies analyzed.

Delimitations of the studies. In a number of instances no delimitations were cited.[15] However, of these identified, the following points were noted with greatest frequency: problems relating to establishing controls groups and experimental designs (15), problems relating to testing procedures (6), problems relating to procedures for implementing the CE program, e.g., students did not receive a concentrated exposure (4). In addition, several studies (4) identified problems relating to the short time period covered by the project, e.g., the time required for proper implementation, the short intervention period, and the fact that basic skills take years to develop and/or modify.

Career education treatment. In spite of the importance of the CE treatment, some of the studies were not overly generous in sharing with the reader the specific nature of the program. This was not true of all the studies, but it occurred often enough to cause some frustration on the part of this analyst. Nevertheless, here is what I found....

By and large, the CE treatments described in the study reflected the overall approach which often is presented in the following sequence: beginning in the elementary school and continuing through college education... emphasizing the process of career development--including career awareness, career exploration, career motivation, career decision making, career preparation, and career entry. All of these were reflected to some degree in the studies analyzed.

Over half of the studies (21) indicated the development of specific curriculum guides, units, learning modules or lesson plans. Although the terminology differed, the overall process was evident. The teaching strategies were often refered to as "the infusion process" in which curriculum units were integrated into career information. Other related approaches included the use of competency-based modules, data-centered systems, and self-instructional packages.

Staff development, in-service programs, and workshops of various sorts were specifically mentioned in a number of instances (18), as were the use of community resources, field trips, or site visits (10), and "hands on" experiences (8).

The various studies of the Research and Development laboratories and of Gibboney Associates dealt with what is often referred to as experience-based models. Those descriptions included such program elements as: self-paced learning resources, direct participation in a vocational environment, site activities integrated with the rest of the curriculum, the integration of work and learning experiences in the community, direct experiences in a variety of community settings, and comprehensive, individualized learning.

Lastly, a word on program length: while the majority of the studies appeared to be for one academic year, the range was wide. Unfortunately, the data was sparse on this. Some of the reports were of projects which covered two or three program years, while others were much shorter than one year. Two illustrations: "The intervention period during which student instruction was provided was limited to a maximum of 12 weeks," and "exposure to CE programs over a six-week period."

Highlights from the studies: findings and conclusions. The studies have been categorized into eight groups. From this section, we hope the readers will begin to gain a "flavor" of the studies.

Dissertations. While the NIE search disclosed numerous CE dissertations over the past few years, only two appeared to relate directly to the issue at hand. The 1973 dissertation (Feit) found no statistically significant differences between experimental and control groups in levels of reading and math in the 4th and 5th grade. In the interpretation, the

researcher stressed the limitations in the choice of measuring devices. This dissertation itself was a rather limited field study which the author noted lacked proper control of the experimental situation.

The 1975 dissertation (Bryant) was somewhat more elaborate, although it was indicated that the length of the implemented program was only approximately four months and that teachers in the experimental group had no knowledge of CE prior to the initial orientation period. The researcher reported statistically significant differences favoring the experimental group, with most significant gains in the total test battery, vocabulary, language, mechanics and expression. This lead the author to affirm that the integration of CE concepts can have positive effects on cognitive growth.

One teacher, one middle school, and one high school. A study of New Educational Directions (Bagley) attempted to determine whether one teacher's effectiveness improved after adoption of a CE-oriented approach as reflected in the academic growth of students over one year. The differences between groups in math were judged to be of no significance. In reading the greater achievement of the CE group was significant (.025), causing the researcher to conclude that the results indicated the adoption of CE activities appeared to affect students' growth in reading achievement during the year they spent with the teacher.

A study of a CE program in a middle school in Connecticut (Gagliardi) included the use of city administered achievement testing. Simple comparisons were made which indicated that the CE group did better than the non-CE group in terms of improvement of grade-level equivalence in reading

(a .4 difference) and math (a .2 difference). A city government administrator reflected that while the gains were modest, they were consistent and supported other indicators of success.

A study at the high school level in Connecticut (Lapinsky) conducted with slow learners and disadvantaged youth found that students showed an average gain of 1.7 years (9th grade) and 1.3 years (10th grade). The 9th grade gains ranged from 1.0 to 3.7 years and the 10th grade gains, from .0 to 2.8 years. The report concluded that the program facilitated, reasonably well, better adjustment on the part of students to school and the improvement of basic skills.

Local districts. Six studies disclosed generally favorable results in various ways.

While the Ceres Unified School District study (Green and Hildebrandt) had some problems with contamination of the groups which had been planned to be the control, the findings revealed that the experimental groups significantly exceeded the control in 1st grade reading and 2nd and 4th grade math and reading. This caused the researchers to conclude that there was considerable evidence to substantiate that experimental students would score significantly higher on standardized tests than would the control students.

Both the studies in Cheektowaga, New York, and Newark, Delaware, were similar in that while comparative scores between groups were not significant, achievement gains were made within the treatment groups. The

New York State study (Conway) used criterion-referenced instruments written to match objectives in CE packages. The study found that while extensive treatment effects could not be demonstrated, both groups showed achievement gain, almost without exception, between pre- and post-tests.

In the Newark, Delaware, study (Wasdyke), the instrument also was a criterion-reference tool, the CE Cognitive Questionnaire. The findings stated that within the groups the difference was statistically significant at the .01 level but that differences between groups was not significant. The researcher concluded that if the strength and direction of the correlation holds with the larger number of cases in the final evaluation group, the relationship between mean posttest scores and exposure to treatment will be significant.

In the Elkhart, Indiana, study (Morrison), which concentrated on the creation of teacher awareness rather than on student change, growth gains in language and reading skills were reported ranging from .6 to 3.3 years, with the average gain 1.5 years. The researcher, however, called attention to the fact that the students did not receive a concentrated exposure to CE during the year.

An extensive study in Pittsburg, Kansas (Huffman) covered a period of several years. The second year evaluation, which ended in April 1975, presented a large amount of data. At the 3rd grade level, while comparisons between groups revealed no statistical differences, post-test scores showed a substantial gain for all tests of the experimental group. At the 6th grade level, the same was true, i.e., no statistical differences between groups, but data on six tests (reading, spelling, math computation, problem solving, total math, science) appeared significant at the .001 level within the experimental group. The conclusion drawn was that the CE program neither enhanced nor inhibited the traditional learning process at these grades. Substantial growth was reported in all nine areas in both grades. At the 9th grade level, a different instrument was used (the ABLE test); the report stated that on this test the difference between pre-test and post-test distribution of scores was significant at the .001 level of confidence.

The third year evaluation (ending in March 1976) in Pittsburg, Kansas, was similar to the previous year in that at the 3rd grade level, no statistical difference was evident between groups, but substantial gains were made over pre-test scores in all nine test areas. At the 6th grade level, the same was true between groups, but there was substantial growth in all 11 test areas. For the 8th graders, it was reported that the career math

program had a positive effect on the performance of students. (No further elaboration was made.) In correspondence from Huffman (12/30/76), the conclusion presented was that "...we could not show significant difference from the control group, but we did show continued growth in achievement as should be expected, and also have included many activities that promoted awareness, exploration and preparation including decision-making skills."

In Philadelphia, the Opportunities Industrization Centers of American, Inc., study (Gibboney Associates) generated a wealth of data. The descriptive section of this report revealed a situation in which the interns, in reading, gained five academic months in an average of eight program months and, in math, four academic months in this period. In comparison, the average scores of the control students did not change. The conclusions from the report indicated that if the students can build on this start and continue to develop their skills, their post-CIP (program) chances will be fairly bright. A great deal of technical data was given to support the conclusions.

County systems. Several county studies have been conducted over the past few years in this area. Probably the most widely cited one is the Lincoln, County, West Virginia, study (Olson). Olson's major findings were that the adjusted post-test means for the experimental group were 11% higher than those of the control group on language achievement and 24.5% higher on mathematics achievement. The researcher concluded that utilizing experiential activity to illustrate abstract symbols and concepts related to CE goals is an effective method of increasing academic achievement.

Stating this another way in an earlier report based on the same data, Olson wrote that illustrating the value of academic skills in terms of their relationship to the career would provide an effective vehicle for achieving both CE and academic subject goals.

The Calhoun County, Michigan, study (Simpson) utilized minimum performance objectives developed by the Michigan State Education Department in mathematics. The findings for the 3rd and 4th grades supported the hypothesis that academic competence--measured by a math test--would not be impeded as a result of treatment. In the 5th grade the report also indicated that academic achievement would not be impeded as a result of CE instruction since the experimental students performed at least as well in mathematics. The conclusions drawn were that the integrated approach does not interfere with academic learning of students exposed to this kind of treatment and that, in some instances, achievement may be enhanced by this approach. Also, in some instances when academic skills are not greatly enhanced (as in the 3rd and 4th grades), the approach does not interfere with student learning...(therefore) not only can it provide the essential basic skills at the same level as traditional teaching, it delivers other information and knowledge that normally is not provided in the latter approach.

The Henderson County, Kentucky, study (Gibson) was mainly concerned with average gains per year compared with national norms. The findings revealed that in the three years of assessing data, the average score remained somewhat below the national norm although in the third year there was an appreciable gain. As in several other studies, the researcher

concluded that even though one could not say the program gave a tremendous boost to the academic skills areas, there was no loss either. The report also assumed that there were concomitant gains in motivation for some of the students.

The Dade County, Florida, study (Department of Planning and Evaluation) utilized State-wide assessment instruments. It was reported that the acquisition of reading skills were somewhat higher for the CE group. The results of 8th and 9th grade tests showed that achievement in basic skills of math and reading were being clearly but not spectacularly impacted by the CE program. In math, the junior high schools not only surpassed average results in the county but were higher than State averages; reading outcomes were higher than county but lower than State averages. The conclusion stated that related achievement in the basic skills will likely surpass State and national norms for many schools.

The Prince George's County, Maryland, project is particularly interesting, for we were able to secure two separate reports of the study. Since they dealt with the same data but used different sources to disseminate the findings, we have presented both reports (Crawford and Bowen/M.F. Smith). While the descriptions varied in detail, both reports used the same terminology to describe the findings that when individual classes were combined across schools within grade levels to form experimental and control groups, the experimental samples scored significantly higher in reading and arithmetic with exceptions of 6th grade reading and senior high language usage and social studies. Both reports used the same terminology in concluding that the results seemed to confirm that students

involved in CE are different than those not involved. However, both reports stated that one should be cautious in attributing cause to any one factor.

Since the Union County, North Carolina, study covered a period of two years, two reports are cited. In the first year, the researchers (Cox and Parramore) reported that 6th grade achievement among the treatment students was greater than the control sample in reading (.05); there was a difference but not a significant one in arithmetic achievement. The 7th grade section of the report stated that mean grade equivalents showed the inequality of groups with the control group achievement higher. The evaluators stated that, in their belief, had pre-tests taken place, there would have been a significant difference in beginning knowledge of the groups--with the control higher. No further conclusions were presented. In the second year, the researchers (Clary, Cox, Parramore) reported no significant gains by treatment students in reading; however, on math, most language subjects subtests, spelling, and the total battery, students had significantly higher mean percentile scores on the post-test. Regarding the control, the increases were not as statistically significant as the results for the treatment students. Regarding comparison of groups: the treatment students' gains were significant on two sub-tests and the total battery: mechanics of language (.01), total language (.05), and total test battery (.05).

The Kentucky study in Region XII was reported on two occasions. (Omvig, '74 and '76). In the 1974 report, Omvig found no significant comparisons

between groups at the 4th grade level. For the 8th grade, he reported significant differences for the CE group in math computation (.001 level) and that the group learned this skill at a relatively faster rate. For the 11th grade, Omvig reported the finding that the CE groups was slightly lower on math applications and slightly higher on study skill graphics. Because of the relatively short time period (one year) covered by the study, Omvig did not anticipate many significant changes. In fact, he pointed out that basic skills take years to develop and/or modify. He concluded that, as had been expected, academic achievement levels did not vary to any great extent between the groups.

The Kentucky study in Region XII reported additional data in 1976. Omvig noted that the previous control group data from 1974 were utilized in the 1976 analysis. This time he reported, for the 4th grade, that when groups were compared, five significant differences were identified. In all cases the CE group had higher means and were especially significant in vocabulary and math computation. He felt that perhaps of most significance was the difference in the total score, a composite of eight subtests. In the 8th grade, two significant differences were found in favor of the CE group--reading comprehension and study skill/reference. The CE group outscored the control on all subscores except spelling. In the 11th grade, he found no significant differences between groups. Omvig concluded that overall the CE students tended to demonstrate higher achievement scores and that they especially outperformed non-CE students at the lower grade levels. He suggested that the lack of differences at the high school level may have been attributed to the fact

that the pattern of achievement had been well established prior to these years. He also noted that the program concentrated on the lower grades and that it was more difficult to integrate CE into the high school since not all students follow the same curriculum. Therefore, the researcher felt that the differences in achievement at the lower grades may really be a reflection of the effect of different curriculum approaches.

The Jefferson County, Kentucky, study (Rapley) reported data as part of the overall systemwide achievement testing program. The conclusion was that although the number of students tested was in some cases not very large, the general trend was obvious: there were sizeable gains in most grades, probably larger than would be expected in the short interval between the testing. The report concluded with the following statement: "We feel, therefore, that there is a strong probability that the CE program (perhaps in combination with other instructional programs in these schools) had an overall positive impact on both reading and mathematics achievement."

The Cobb County, Georgia, study (Katz and Morgan) reported that the objective of increasing academic achievement was partially attained. However, this was based upon a simple comparison of mean composite scores which were generally more favorable to the four project schools. The researchers responsible for the evaluation component did not test for significance.

State systems. Two States reported research on this issue: Minnesota and Kansas. The Minnesota study (B.B. Smith), a "summative evaluation" of

seven projects, utilized specially developed tests to assess CE impact on cognitive achievement. It was reported that the impact was minimal. The major findings: differences in student achievement were detected for experimental and control groups, but these differences were small and not always in favor of the experimental groups. Students in the experimental group, however, tended to have slightly higher mean scores in grades 1-3 and 4-6. The data suggested a trend for the experimental students, particularly on the 1-3 test; 67% of comparisons were in their favor. Four explanations were given for the overall results: (1) the possibility that the tests did not adequately sample the content emphasized by teachers in the exemplary projects, (2) teachers in the control schools had perhaps been teaching CE concepts, (3) inadequate amount of instructional emphasis and time (1½ hours per week), and (4) one year of CE instruction may be insufficient.

The Kansas study (Schultz) indicated that there was no significant difference in math or English achievement in the project. However, the treatment population did significantly better than the control in 7th grade social science and in 7th and 8th grade science. The conclusions drawn: The CE treatment certainly was not debilitating. The findings "were not too surprising when one considers the less experimental nature of (academic) disciplines vis-a-vis social science and science (which are more experimental and hands-on type of instructional)...these reasons account for the dichotomy of scores insofar as levels of significance... We feel that in a statistical, as well as an academic sense, CE has proven to be a success."

The Partners in Career Education study. The comprehensive research conducted by Partners in Career Education in Texas (Elvis Arterbury, Director) was a two-phased approach: Study #1 dealt with language arts and social studies; Study #2 with mathematics.

In Study #1, statistically significant results were found in subtests dealing with reading-vocabulary, language-mechanics and expression, and study skills-reference and also on total reading scores, total language scores and on the total test battery. While the report noted that the studies were not conducted according to rigorous research designed criteria, the results reaffirmed the belief that CE can make a difference. Student achievement was attributable to support provided and special efforts of the teachers.

In Study #2, the report specified that even though pre-test scores indicated that the groups were not accurately matched, the pre- and post-test mean score differences recorded for the experimental group were higher and a statistically significant difference existed in one subtest: math application (.01). The report concluded that the methodology for infusion should help allay fears regarding implementation, for the students progressed in every academic area tested at a rate equal to or greater than those not utilizing CE.

Four recent Office of Career Education projects--FY 75. Of the four projects which included data from the Office of Career Education grants during the period 7/1/75 to 6/30/76, one report (T.C.Smith, Jr.) clearly indicated that a career orientation course--for bilingual adults in Texas--was found

to enhance reading comprehension significantly in about one-half of the instructional time used for a significant increase via the regular high school diploma or equivalency approach. The indication was that the use of a Grid demonstration (telecomputer system) resulted in significantly higher cognitive achievement than when instruction was presented without access to the Grid. This led the researcher to conclude that integrating occupationally relevant content and basic skills enhances and facilitates mastery of basic skills, at least for the adults who were involved in the program.

The study from the Northwest Tri-County Intermediate Unit in Pennsylvania (Minnis) reported only minimal differences between experimental and control groups and concluded that given the limited amount of time during which the students were exposed to the project, the benefits of CE could not totally be assessed by the testing program. The study noted that all groups made gains in achievement but that it was not possible to show that through the use of career units greater gains were made by the experimental group.

The data from Newark, New Jersey (Streit) indicated 5th grade students showed significant improvement in both reading and math but that the treatment appeared to have no overall significant impact on increasing reading test scores throughout the grades and only varied impact by grade levels in increasing math scores. (2nd, 4th, and 5th grade pupils who were involved in CE achieved <u>actual</u> post-test scores which were higher than the <u>predicted</u> post-test scores.)

The fourth study--in Richardson, Texas (Brownlee)--concluded that the impact of the project in terms of producing significant cognitive gains among students was found to be negligible. However, the report pointed out that the intervention period during which student instruction was provided was limited to a maximum of 12 weeks.

Regional R and D laboratories. Four R and D laboratories over the past few years have conducted extensive research on various experience-based (EBCE) programs.

The Far West Laboratory for Research and Development study (Christensen and others) looked at several skills areas. In written communication, students showed a very significant increase in their knowledge of the mechanics, ability to communicate effectively, and maturity of written thoughts. While they improved their writing skills, the report indicated that there was no reason to assume the FWS (program) is either more or less effective than comparison schools in this regard. Similarly FWS students improved their reading skills but not significantly more or less than comparison students; the experience did not result in any disadvantage relative to students in more conventional high schools. In terms of quantitative skills, FWS student effects did not significantly differ from those obtained by comparison students. Overall, the experimental group had a greater average change in math, although the difference was not significant. In reading, the control group changed more than did the experimental group. The researchers concluded that the learning of basic skills did not suffer through the elimination of classroom instruction: there was no significant difference in performance between the groups,

despite the fact that the remedial portion of the basic skills program was not fully in place until the spring of 1974. /Note: data on basic academic skills was not reported by the FWL for 1975./

Research for Better Schools (RBS) in Philadelphia has conducted several research studies in this area. The report of April, 1975 (Kershner and Blair) indicated that only minimal support can be given to the hypothesis that experimental students were superior to control students. The experimental means were always higher than the control means but only in the case of one subtest was the difference statistically significant (arithmetic applications); the experimental group did not show any significant gains over the control group in the other basic skills subtests. The researchers concluded that the experimental students gained significantly in basic skills during the project; basic skill gains of experimental students were higher but not significantly different.

Later that year, RBS published additional research in this area (RBS report of 9/26/75). It was reported that both 1st and 2nd year experimental students showed some significant growth over the year but not in all areas tested; the analyses did not indicate significant superiority of the experimental students in any test employed. Within group data, however, showed a significant growth on two or three subtests (arithmetic concepts and applications). In terms of comparison of groups, analyses of data identified a significant grade difference in reading comprehension on both the pre and posttest. Only one other statistically significant finding was identified, i.e., a significant grade difference in pretest

performance on the arithmetic concept pretest. The experimental groups did not outperform their control counterparts.

A great deal of data was generated in the RBS report on cumulative effects, 1974-76 (Biester). The highlights are as follows: There was strong support for the hypothesis that experimental students would acquire increased mastery in basic academic skills. In terms of comparison of groups, the experimental group exhibited significantly higher growth rates when compared with performance projected from the control group on two out of three subtests in arithmetic. There was no significant difference between groups in reading, although the experimental group seemed to close an initial gap in performance means. Thus, there was support that the experimental students will acquire significantly greater mastery in basic skills than control students in a traditional program. The report ended with this note: "In conclusion, it has been demonstrated that students benefit from both one or two years of participation in RBS Career Education..."

The Appalachia Educational Laboratory study in 1974 (Hilderbrand, Hollenberg, and Sanders) also generated a great deal of data. Using the Educational Development Series (EDS) as the testing instrument, the report indicated significant differences between groups in reading (.05) and math (.05); significant growth of all groups combined was found in reading (.01) and English (.01). Analysis of the mean gain scores for each of the six subtests by group indicated no overall group differences. However, the report indicated differences between groups on English (.01) with

COOP (a control group) showing greatest gain. On the Iowa Test of Educational Development (ITED): experimental students indicated significant growth in reading comprehension, language arts, math and science. The 11th grade EBCE students demonstrated greatest overall growth. The report concluded that the EBCE program was judged very successful since it did successfully serve as an alternative educational program.

The Appalachia Educational Laboratory study in 1975 (Shively) also was a comprehensive project. In terms of comparisons on academic achievement, the report stated that there was no significant differences in achievement between the true experimental group and true control. Several hypotheses were considered: (1) That $E_1$ group will acquire increased mastery in basic academic skills; they apparently did not. (2) That $E_1$ would do as well in basic academic skills as $C_1$; they did, but it appeared that there was little difference in the performance of these groups on three subtests--reading comprehension, arithmetic concepts, arithmetic application. (3) That $K_1$ (Charleston HS) will acquire increased mastery in basic academic skills; they showed no significant gains as measured by the three subtests. The conclusion was the same as the previous year's report.

In the third report of the Appalachia Educational Laboratory (Shively and Kessel), it was stated that the EBCE students showed no significant gains or losses on the same three subtests but maintained their mastery in basic academic skills. A great deal of data was gererated across the various sites. The conclusion was that although the results were not

similar across all sites, the evidence does favor EBCE and, consequently, implementation of EBCE as a viable alternative to the traditional secondary programs has been demonstrated.

The Northwest Regional Educational Laboratory 1975 study (Owens, Haenn and Fehrenbacher) disclosed that $(CE)_2$ students made statistically significant gains, especially in reading comprehension. They also made marginally significant gains in arithmetic concepts and application, but when conditioned for reading comprehension, those gains disappeared. It also reported no significant differences in the adjusted mean posttest scores. It found support for the hypothesis that $(CE)_2$ students would not gain less than comparable students. The conclusion was this: Results tended to support the hypothesis that $(CE)_2$ students would make gains in basic skills and that controls would not gain more. It stated that this is an encouraging if not impressive result, especially considering the fact that $(CE)_2$ was not a concentrated basic skills program.

The Northwest Regional Educational Laboratory 1976 study (Owens and Haenn) detailed these findings: For the $(CE)_2$ students in the program for two years, there was two years growth in reading comprehension during the first year and an additional year of growth during the second year. Marginal growth was detected on arithmetic subtests. For the first and second year students: an average of one month's growth in reading comprehension per month of program and marginal growth on arithmetic subtests.

The findings for the pilot sites: while student growth was generally positive, gains in reading comprehension were statistically significant for

only one site. Educationally significant gains in reading comprehension were evident for three or four pilot sites, on arithmetic concepts for one site and arithmetic applications for two sites.

Nota: These four programs have been supported by NIE grants. Ronald Bucknam, senior associate of the NIE Education and Work Group, holds primary responsibility for overseeing their development and evaluation. Utilizing data from the draft of an Education Testing Service final report (of January 1976), Bucknam has summarized in much detail the impact of EBCE[4]. (The final version of the final ETS report is expected at the NIE in the late spring, 1977.) Because of the importance of his summary article, selected portions are reproduced below (The thesis is that EBCE is not designed to improve academic achievement but to achieve an entire set of outcomes, especially those designed to ease the education/work transition.)

- There are three areas in which EBCE has sought to measure outcomes. Each is equally important because without positive findings in each... an innovative program cannot long exist....(The three are: community support, academic quality, and programmatic effects.)

- ...academic quality. That is, students in the experimental program cannot be hurt academically, especially in terms of reading and math achievement, by being involved in the programs. If this academic consistency cannot be shown, then either (1) the programs will not be utilized, irrespective of the quality in other areas, or (2) they will only be used with students for whom academics are relatively unimportant. Both alternatives should be avoided since they adversely limit the usefulness of the programs' educational value.

- Academic achievement is important to include in a discussion of the outcomes of EBCE because one might have cause to question whether students who spend up to 80% of their time out of a school building will not suffer academically.

  All four programs measured all their experiental and control students who started and finished using the CTBS at the beginning and at the end of the 1974-75 school year. <u>The hypothesis was that there would be no significant difference on three subtests of the CTBS</u>.

  The findings were as follows: Of the possible 12 comparisons, 10 were not significantly different and two were significantly different in favor of the control groups.

  <u>The evidence shows that the hypothesis (that the students would not be academically hurt by being in the program) is substantially upheld</u> (Emphasis added). The two exceptions are neither in the same subtest nor the same lab program, as shown below:

| CTBS subtest | Lab A | Lab B | Lab C | Lab D |
|---|---|---|---|---|
| Reading Comp. | NS | -SIG | NS | NS |
| Arith. Concepts | NS | NS | NS | NS |
| Arith. Application | NS | NS | NS | -SIG |

## III. THE CONCLUSIONS

Three general observations.

(1) It would not be accurate to say that all of the projects were full-fledged experimental designs or that the evidence leaned overwhelmingly toward the experimental groups. The researchers themselves pointed out a number of delimitations in their studies and the Data Charts disclose that the experimental groups did not consistently outperform their counterparts. Yet, the overall data is reassuring. Looking not at one isolated report, but viewing the total picture, one can observe the situation as quite favorable. There are some who have felt that CE would hurt academic achievement. That is certainly not an interpretation this analyst would draw from the data. In my opinion, the data should be enough to whet the appetite of CE supporters and critics alike. It is sufficient, I believe, to enable even the latter to say, "Yes, perhaps there is something to this approach to education...."

(2) Of the 38 studies, the findings were generally supportive of CE in certain areas: 19 studies reported data which indicated that either reading and/or mathematics was impacted at either an .05, .01, or .001 level of significance or, in the case of the R and D laboratories' studies, which indicated that the treatment students maintained their growth in the basic academic skills areas. Sixteen studies were moderately supportive in that they reported data which either indicated reading and/or math grade equivalent score improvement, achievement gains for both experimental and control groups, or varied impact, i.e., CE neither

enhanced nor inhibited growth in these areas. Three studies reported data which indicated either negligible or minimal impact. The overall observation I would make is that academic achievement generally was either impacted positively or, when it was not, it did not interfere with that goal. In a word (two actually), I believe that the studies can be interpreted with guarded optimism. CE surely has nothing to be "ashamed of" when it comes to basic academic achievement.

(3) In some ways it is difficult to summarize or be "analytical" with the data since they are so comprehensive and since the studies varied so greatly. That is why this analysis is basically presented in descriptive terms. Nevertheless, I believe the general directions are positive and the overall tendencies are clear...to this analyst, at least. However, as I indicated earlier, each reader is free to draw his or her own conclusions. Those presented are mine.

* * * * *

On the chart which follows, I have attempted to summarize the studies on the basis of these general tendencies, as I observed them. Originally it was my intention to submit the data to a panel of judges to try to determine how they would categorize the studies. Unfortunately, the pressures of publication time intervened and this was not done. It occurred to me, however, that each reader would be free to do this --- and so our "panel" has become much larger.

This is how I see "the complete picture":

Studies which were generally supportive in certain areas.....

Olson (.01 in math, .01 in language --- grades 1-6)

Crawford and Bowen (.001 in reading & math in 7th & 9th grades) (Note: discrepancy)
M. F. Smith (.01 in reading and arithemtic)

Green and Hildebrandt (.01 in reading in 2nd grade, .05 in math)

Bryant (.001 in total battery, .01 in reading, .001 in vocabulary, .001 in language, .001 in mechanics, .001 in expression--- in 5th grade)

Partners in CE (.01 in reading, .001 in language, .01 in expression; .01 in math application-in 5th grade)

Omvig '74 (.001 in math computation in 8th grade)

Omvig '76 (.05 in vocabulary and math computation in 4th grade; .01 in reading comprehension in 8th grade)

Cox and Parramore (.05 in reading in 6th grade)

Clary, Cox and Parramore (.01 in mechanics of language, .05 in language total, .05 in total test battery-in 3rd grade)

Gibboney Associates (reading: .001 pretest covariate; math .01 pretest covariate)

Studies of the R & D laboratories:

AEL: Hilderbrand, Hollenberg, Sanders (.05 on EDS test; .01 reading, .01 English)
Shively ( E group did as well as C group in basic academic skills)
Shively & Kessel (EBCE students maintained mastery in basic academic skills)

NWL: Owens, Haenn, Fahrenbacher (statistically significant gains, esp. in reading comprehension)
Owens and Haenn (significant gains in reading comprehension in 3 of 4 sites)

RBS: Kershner and Blair (E student gained in basic skills during project)
RBS - 9/26/75 (significant grade difference in reading comprehension)
Biester (cumulative effects - support that E students will acquire greater mastery)

FWL: Christensen et al (experience did not result in any disadvantage)

Studies which were moderately supportive .....

Gibson (no tremendous boost ... but no loss either)

Minnis (all groups made gains ... but not possible to show effect of treatment)

Rapley (sizeable gains in most grades ... grade equivalent scores)

Morrison (growth gains ... grade equivalent scores)

Lapinski (gains ... grade equivalent scores)

Wasdyke (statistically significant gains within group)

Bagley (.025 in reading, but not in math)

Streit (varied impact in math, but not in reading)

T. C. Smith (adults ... enhanced reading comprehension in 1/2 time)

Gagliardi (gains ... grade equivalent scores)

Katz and Morgan (overall means were equal or higher)

Huffman (substantial growth in all areas ... program neither enhanced nor inhibited traditional learning process)

Schultz (treatment certainly was not debilitating)

Simpson (approach does not interfere with learning)

Dade County (reading skills somewhat higher; math and reading - clearly but not spectacularly impacted)

Conway (both groups showed achievement gains)

Studies which were unsupportive .....

Feit (non-significance)

Brownlee (impact negligible)

B. B. Smith (impact minimal)

* * * * *

Grade level observations.

Few generalizations can be drawn, I believe, from the data with regard to the question of grade level significance. It is interesting to note, however, that in two out of the three studies which were categorized as unsupportive, the data was collected and interpreted in broad terms, i.e., in situations varying from K-12 and 1-9. The overall picture looked like this:

| Grade level which significant data was found in generally supportive studies | ...moderately supportive studies | ...unsupportive studies |
|---|---|---|
| Olson - 1-6 | Gibson - 6 and 8 | Feit - 4 and 5 |
| Crawford ... - 7 and 9 | Minnis - K, 2, 4, 9, 10 | Brownlee - varied K-12 |
| Green ... - 2 | Rapley - varied 2-11 | B. B. Smith - varied 1-9 |
| Bryant - 5 | Morrison - 8 and 9 | |
| Partners ... - 5 | Lapinski - 9 and 10 | |
| Omvig '74 - 8 | Wasdyke -3 | |
| Omvig '76 - 4 and 8 | Bagley -6 | |
| Cox ... - 6 | Streit - 2, 4, 5 | |
| Clary ... - 3 | T. C. Smith - adults | |
| Gibboney ... - 10-12 | Gagliardi - 8 | |
| R and D labs - high schools, mainly 10-12 | Katz - ... - 3, 4, 6 | |
| | Huffman - 3, 6, 8, 9 | |
| | Schultz - 7 and 8 | |
| | Simpson - 3, 4, 5 | |
| | Dade City - 8 and 9 | |
| | Conway - varied 1-12 | |

Subject matter observations.

Similarly, few generalizations can be drawn with regard to the question of subject matter focus other than to say that in the generally supportive studies (excluding the R and D lab studies), a few more citations of positive results were itemized for reading (7) than for math (5) or total language (5), although additional findings were positive in such language aspects as mechanics and expression. In the R and D Studies, both reading and math components were favorably reported, particularly reading.

Length of data collection observations.

Here, too,while it is difficult to generalize, some observations can be made. On this point, unfortunately, a number of the reports had limited information so that the length of the period only could be infered. Most appeared to be for one academic year. Of the three unsupportive studies, Feit apparently researched students who had been in the CE program for 3 years, but the actual testing period was not indicated; Brownlee's instruction was limited to a 12 week period; and B. B. Smith indicated that a one year period - 1 1/2 hours per week -- might have been insufficient.

With a few exceptions, most of the studies in the moderately successful category appeared to collect data over one academic year. Gibson, however, reported scores over a 3 year period; Minnis cited the limited amount of time during which students were exposed to the project; Wasdyke indicated exposure to the curriculum unit over a 6 week period; the Katz and Morgan results were based on tests taken at the end of the 2nd year of the project;

Huffman reported data at the end of a 2nd and 3rd year evaluations.

In the studies which are categorized in the generally successful group, the variation is similar. Olson described a 3 year CE program, but it was not clear if the test resultswere for this entire time since an earlier Olson report (1972) cited some of the same data as the 1974 study. Some of these studies compared scores from one year to another (Green and Hildebrandt). The Partners in CE study indicated 17 weeks of student instruction in the language arts phase. Omvig's two studies cited data collected over one academic year, as did the two from Union Country, North Carolina (Cox and Parramore, Clary and others). Gibboney Associates report on the long-range program of the Opportunities Industrialization Center but indicated that the average time between pre testing and post testing was 8 months. Most of the studies of the R and D laboratories were for one academic year, but one RBS study (Biester) reported cumulative program effects.

CE treatment observations.

As with the length of the data collection period, it is difficult to generalize since, as stated before, it was not always possible to ascertain--from the printed reports--the degree of the "delivery of program components". (One researcher, M. F. Smith, spoke of this as "the nebulous variable"-and it was.) I wish it were possible to illustrate clearly and simply the direct relationship between the scope and intensity of the CE treatment and the results. But, because of the nature of the reports, a one-to-one relationship can not be easily drawn. However,

some general observations again can be made.

In the reports of the three studies which were categorized as unsupportive, little CE data was given. Feit implied that a week of inservice training preceeded monthly afterschool planning and implementation of CE units; Brownlee described "2 data centered systems" (sequencing and needs assessment); B. B. Smith implied that activities included inservice training, the use of different curriculum or instruction materials, and guidance services.

On the other hand, the report of the studies which were categorized as generally supportive appeared to have rather detailed activities delineated. For example: Olson listed a number of teaching strategies; Crawford and Brown/M. F. Smith--workshops and classroom guidance; Green and Hildebrandt--the use of CE units and course materials; Bryant --teacher developed CE curriculum guides; Partners in CE--numerous staff development activities; Omvig--a 3 year developmental program; Cox and Parramore, Clary and others--inservice workshops, career centers, and numerous program activities; Gibboney Associates--a well-developed Urban CE Center with various programs; and the R and D labs--a comprehensive program of "experience-based" CE.

While it cannot be stated unequivocally that the more intensive CE treatments lead to the more positive results, it can be observed that when the results were, indeed, "generally supportive", a fairly intensive CE program appeared to be in place.

What are the effects?

What are the "expected effects" on students in CE programs? Is CE becoming

a "substitute" for basic curriculum? Does it interfere with the goal of academic achievement? As the CE concept is being discussed more frequently, these are some of the questions people are beginning to ask. Perhaps this analysis will help begin to answer these questions. True, the total number of studies was not large and some of them left something to be desired. On the other hand, these 38 studies represented just about all the existing research on this very specific issue. At this point in time, they are just about all we have to go by. Therefore, 'at this point in time', one can note that, with few exceptions, there were few adverse effects. CE does not appear to ring the death kneel for the teaching--and learning--of the basic academic skills.

I reemphasize this point by having some of the researchers speak, briefly, for themselves:

Gibson: "...there was no loss either"
Minnis: "...all groups made gains in achievement"
Rapley: "...sizeable gains in most grades"
Morrison: "...growth gains..."
Lapinski: "a check of 5 students... maintained and improved their grade level scores"
Wasdyke: "analysis of difference within groups... significant"
Bagley: "...appears to have affected students' growth in reading achievement during the year"
T. C. Smith: "...enhances and facilitates mastery of basic skills"
Streit ;"...significant improvement in reading and math (G5)"
Gagliardi: ("...modest but steady gains...") noted in a letter from a city administrator)
Katz and Morgan: "...overall means for project schools were equal or higher"
Huffman: "...continued growth in achievement,as should be expected" and "neither enhanced nor inhibited the traditional learning process"
Schultz: "The CE treatment certainly was not debilitating"
Simpson: "...approach does not interfere with academic learning... In some instances achievement may be enhanced..."

Dade County: "...clearly but not spectacularly impacted by CE program"
Conway: "both groups showed achievement gain..."
Olson: "...an effective method of increasing academic achievement"
Green and Hildebrandt: "...considerable evidence to substantiate... experimental students would score significantly higher..."
Bryant: "...positive effect upon cognitive growth."
Partners in CE: "Result reaffirm belief that CE can make a difference. Student achievement attributable to support provided and special effort of teachers."
Omvig ('76): "It appeared that CE students outperform non-CE students at lower (grade) levels."

As far as the R and D laboratory studies are concerned, the conclusions, while stated differently, were basically the same: the experience did not result in any disadvantage, in fact, in many cases the experimental students did as well or better than the controls in basic academic skills. Christensen and his colleagues summed it up in their conclusion: "The learning of basic skills did not suffer....The primary emphasis of the program is on skills acquisition through field experiences."

Some additional "data" and concluding thoughts.

In reviewing the 38reports, as well as a similar number of background items, I came across several other pieces of "data" which should be shared:

(1) The national survey on CE conducted for the academic year 1974-75[27] documented this data:

> Approximately 20% of the nation's teachers have been involved in career education activities. Of fifteen student career education activities assessed, although half of the nation's students were in school districts in which at least one was implemented broadly, only a fifth were in districts that had implemented over half the activities broadly and only 3% were in districts where all had been implemented broadly. (Emphasis added)

I could not help but wonder, as I conducted this analysis, whether the programs, I was reading about were in districts where CE was conceived as being "implemented broadly." I would presume that extensive research probably has not yet been conducted in most places where comprehensive CE implementation is evident.

(2) In handwritten notes (dated 7/29/75) which I came across, Lois-ellin Datta of the NIE Education and Work Group presented several interesting insights:

> The 4, 5, 6th grade reading slump and 10th grade dropout are pretty well known problems. Including data on academic achievement due to increased motivation may be a very sensitive measure for grades 4-6, insensitive for 1-3, and inappropriate for 7-12; dropout reduction may be sensitive for 10th grade but not 1-9.

I believe that future research in this area should be conducted on the basis of this, and similiar, assumptions.

In addition, some guidelines for research were presented:

> Develop a conceptual framework for CE evaluation by cluster, emphasizing short v. long term goals and direct v. indirect outcomes so evaluations can be presented in context.
>
> Double check objectives and evidence of meeting them for each project....we should know why some objectives are harder to reach than others.

These two recommendations speak for themselves.

(3) One of the reports (Omvig '76) included a section addressed to teachers. He asked them several questions including this one:

"What was the most rewarding experience you encountered in working with your students and CE?"

Seven responses were given, in this order: student enthusiasm, enjoyment, and interest; class activities; increased academic performance and relevance; increased career awareness and performance; completed student projects; progress of slow learners and underprivileged students; and community cooperation.

Part of his discussion, because of its relevancy, is cited in full:

> The teachers felt that Career Education established a relevance to the classroom that had been lost, and that because the students can see how academic subjects will be utilized later in life they demonstrated a greater eagerness and an increased inquiry into the world of academia. Teacher after teacher referred to 'the increased interest and attendance', to the fact that the students were now 'given reasons for going to school and for setting goals'. Their concern for school seemed to have resulted oftentimes in an improved performance level by the students. One teacher said her most rewarding experience resulted from the students' 'improvement in grades and their changed attitude toward work', and another teacher saw this year as being 'the most rewarding in all her years of teaching'. She said, 'the children were happy, absentees were at an all time low, and achievement at the end of the year was higher than all my teaching years'. This improvement in the students' academic performance did not, however, stunt or preclude their growth and development in the areas of self-confidence and self-concept, that are intrinsic to the career awareness that should result from a Career Education program.

These classroom teachers--and other like them--are truly at the heart of the CE process. Their judgments should be earnestly regarded.

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## DATA CHARTS

/ Note: The studies are arranged in the order as they appear on the list in Part III. /

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Language and mathematics | West Virginia | Quasi-experimental design 10 (Pretest-Posttest Nonequivalent Control Group Design) described by Campbell and Stanley. | California Language Achievement Tests; California Mathematics Achievement Tests. | 214 = experimented<br>205 = control<br>419 = total |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 1-6 | Analysis of covariance (Multiple Regression Analysis) | Groups did not have pre-experimental sampling equivalence. Subjects not assigned to treatment groups randomly from a common population. Experimental students randomly selected from intact class of students involved in Awareness Program; control students selected from remaining students who had not participated. | Emphasis on career awareness; staff development activities for 29 teachers; teaching strategies then included field trips, resource role models, manipulative activities, simulation, multimedia activities in resource units. Students provided with planned CE experiences for 2 semesters (overall CE program was 3 years) | Funded under Part D, Vocational Education Amendments of 1968. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| All F ratios significant at .01 level. The analysis of data on the test instruments yield F ratios of 7.32 (language test) 14.30 (math test). The adjusted posttest means for experimental group 11% higher than adjusted posttest means for control group on language achievement. Data on mathematics achievement indicate the difference between the experimental and control groups was significant at .01 level. The adjusted posttest means for experimental group were 24.5% higher than adjusted posttest means for control group on math achievement.<br><br>Report of the data (as stated in the 1972 report): Students who were provided with planned CE experiences for two semesters were significantly different on language and math achievement from those who were not exposed... | Study provides evidence to support hypothesis: Utilizing experiential activity to illustrate abstract symbols and concepts related to CE goals (life goals & academic subject goals) is an effective method of increasing academic achievement. In-service education which focuses on both process (human relations) and task (planning, development, implementation) components is effective in delivering CE activities to elementary & secondary students. Conclusion (as stated in the 1972 report): Illustrating the value of academic skills in terms of their relationship to the career world provides an effective vehicle for achieving CE goals and academic subject goals. | LeVene A. Olson |

| STUDY |
|---|
| A Study of Elementary and Secondary Career Education in Lincoln County. Department of Occupational and Adult Education College of Education, Marshall University, Huntington, West Virginia 25701. January, 1974.<br><br>(Reported earlier in "An Evaluation of Elementary CE Based on Language Achievement, Mathematics Achievement and Occupational Awareness in Lincoln County, West Virginia." Marshall University. Dec. 31, 1972) |

1B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Prince George's County, Maryland | Data collected on posttest-only basis (last month of 73-74 school year). | Iowa Tests of Basic Skills and Iowa Tests of Educational Development | not cited |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| Selected classes of grades: 1, 3, 6, 7, 9, 11, 12 | One-way analysis of variance and 2 sample t-tests | The data when the evaluation was begun and circumstances precluded pretesting....A posttest only design is used with no real assurance that the experimental and control groups were essentially equivalent on key variables before the treatment was applied. While some comparison data is presented, it is insufficient. Differences found on the posttest cannot, therefore, be truly tied to the effects of CE. | ... a voluntary participatory experimental program, which attempts to integrate career knowledge, job attitudes, community (business, labor, industrial) parent volunteers visitation program, etc., into the curricula. Also: workshops, classroom guidance and limited financial assistance. ...the method of implementation of the specific program in each participating school was determined by the staff. | Described as an interim progress evaluation--county level. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| When individual classes were combined across schools within grade levels to form experimental and control groups, the experimental samples scored significantly higher ($p<.01$) in reading and arithmetic with exceptions of 6th grade reading and the senior high language usage and social studies. | ...on every question posed...one or more of the combined total experimental groups scored better than their controls. No differences in these groups were found to favor the controls. These results would seem to confirm that students involved in career education are different than those not involved. However, one should be cautious in attributing cause to any one factor. The method of sample selection, the lack of control of the experimental variable--career education--at experimental schools, the lack of pretest data...are some of the reasons for this caution. | N. Edwin Crawford, Director<br>and<br>Lee Bowen, Project Coordinator<br><br>/Note: See also M.F. Smith/ |

STUDY

Does Career Education Work? A Case Study in Prince George's County, Maryland. Upper Marlboro, Maryland 20770. April, 1975.

2B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Prince George's County, Maryland | Test scores results earlier in year were compared to scores on tests given later. Although the initial scores were used in this study, the tests were not given for that specific purpose. | Metropolitan Readiness Test, Iowa Tests of Basic Skills, Iowa Tests of Educational Development (used in 11th and 12th grades) | Grade / Exp. / Control<br>3 reading 58 / 59<br>arith. 58 / 56<br>6 reading 111 / 95<br>arith. 106 / 92<br>7 reading 64 / 56<br>arith. 65 / 57<br>9 reading 238 / 181<br>arith. 238 / 177<br>11, 12 lang. usage 117 / 95<br>soc. studies 102 / 128 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 1, 3, 6, 7, 9, 11, 12 | Analysis of variance for one-way design computer programs; also z-sample + test on the 3rd & 6th grade semantic differentials. | No one school had all of the CE components in action; no two schools had identical programs. (See also Conclusions) | Treatments varied. Each school had its own 'brand' of CE, including these:<br>- a career resource room and teacher<br>- 10-day workshop, business-industrial visitation for teachers<br>- a career development specialist (in 1 school) | Described is an interim evaluation report--county level. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| When individual classes were combined to form total experimental and control groups, the experimental sample scored highest with the exception of 6th grade arithmetic and senior high language usage and social studies:<br><br>Grade / Reading / Arith. / Lang. Use / S.S.<br>3 / E.007 / E.002<br>6 / N.S. / E.025<br>7 / E.001 / E.001<br>9 / E.001 / E.001<br>11-12 / N.S. / N.S.<br><br>(E = favored experimental group) | Results seem to confirm that students involved in CE are different than those not involved. However, one should be cautious in attributing cause to any one factor. The method of sample selection, the lack of control of the nebulous variable (CE) at experimental schools, the lack of pretest data, and the use of previously untried instruments are some of the reasons... | M. F. Smith, Consultant<br><br>/Note: See also Crawford and Bowen/ |

| STUDY |
|---|
| Interim Study of the Effects of Career Education in the Prince George's County Public School System. Prince George's County, Maryland 20770. Report prepared by M.F. Smith, Gainesville, Florida. October, 1974. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and math | Ceres, California | Pre and posttest...for groups when comparing 1973-74 scores to 1974-75. | Cooperative Primary Test (1-3), Comprehensive Tests of Basic Skills (4-6) | Breakdowns were not cited for experimental and control groups. Only these figures were given:<br>Grades Subject Number<br>1 reading 305<br>1 math 307<br>2 reading 264<br>2 math 262<br>4 reading 150<br>4 math 151<br>4 lang. 150 |
| **GRADE LEVEL** | **STATISTICAL ANALYSIS** | **DELIMITATIONS** | **CE TREATMENT** | **TYPE OF STUDY** |
| mainly 1, 2, and 4;<br>also, 8, 9, 10 | Chi Square for 1st and 2nd grade. | The pervasive character of the reading and math improvement programs resulted in broad contamination of groups which had been planned to be control groups. Therefore, at some grade levels, control groups essentially disappeared. | Inservice programs to facilitate the writing and implementation of objectives: including career awareness, planning and orientation. Use of CE units and course materials. Infusion of material into reading and math instruction. | Evaluation component examplary project in vocational education, Part D of P.L. 90-576. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Experimental groups significantly exceeded the control in 1st grade reading, 2nd & 4th grade math and reading:<br><br>Grade / Subject / Chi Square Value / Significance<br>1 / reading / 2.47 / .20<br>1 / math / .54 / NS<br>2 / reading / 6.68 / .01<br>2 / math / 4.64 / .05<br><br>Data also was collected on 8th to 10th grade students. While objectives were not met as stated, the results favored the experimental groups. Data at that level was based on locally developed tests. | Indication that the more inservice activities teachers received, the better students achieve CE objectives. In view of the results, there is considerable evidence to substantiate... experimental students would score significantly higher on standardized tests than would control. | Bill Green<br>and<br>Marilyn Hildebrandt |

STUDY

Ceres Unified School District Career Education Responsive to Every Student. Final Report. September 1, 1975. Ceres Unified School District. P.O. Box 307, Ceres, California, 95307.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Language arts (also study skills) | North Central Texas--ten county area | Pretest-Posttest, Control Group Design (Campbell and Stanley, No. 4) | Comprehensive Tests of Basic Skills | A total of 348 students were involved (no specific breakdowns given). |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 5th | One-way analysis of covariance | Time length of implemented program was 17 weeks. Teachers in experimental group had no knowledge of CE prior to the first orientation period but were asked to begin implementation of concepts immediately. | Teachers in the experimental group participated in staff development and were given teacher-developed CE curriculum guides for use in planning instruction in language arts and social studies; consultant help provided on a request basis. Workshops: 2 days (11 clock hours) followed by additional 2 days. | Doctoral dissertation |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| **Total battery scores:** statistically significant difference between groups was found to exist...favoring the experimental group; level of significance exceeded .001 level. The battery included arithmetic even though CE concepts were not infused into that curriculum. No significant differences were found between the groups on arithmetic test scores.<br><br>**Reading:** F value that was statistically significant at .01 level. Experimental group showed gain, with p<.001 evidence in vocabulary. No significant difference between groups on comprehension.<br><br>**Language:** Experimental group favored in statistically significant difference....Even though spelling scores reflected no difference, the F value...on both mechanics and expression exceeded .001 level.<br><br>**Variation between groups:**<br><br>F P<br>total battery scores 11.89 .001<br>reading 7.99 .01<br>vocabulary 15.34 .001<br>comprehension 0.88 NS<br>language 15.03 .001<br>mechanics 17.90 .001<br>expression 13.56 .001<br>spelling 0.21 NS | ...the integration of CE concepts into the ongoing curriculum can have positive effect upon cognitive growth. A fact that appears to merit attention is that CE concepts were not introduced into arithmetic and no greater gain was made in this area by experimental group.... indications are strong that curriculum planning must take place if academic achievement is to increase. | Rita S. Bryant<br><br>**STUDY**<br><br>An Experimental Study of the Effect of a Career Education Program on Academic Achievement and Attitudes of Fifth-Grade Students. Unpublished Ed.D. dissertation. North Texas State University. Denton, Texas 76203. August, 1975. |

4B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Study #1 - language arts, social studies | Texas | pre- and posttest | Comprehensive Test of Basic Skills | E = 226<br>C = 122<br>(in 4 schools) |
| Study #2 - mathematics | same | same | same | E = 118<br>C = 154<br>(in 2 schools) |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 5th | Analysis of covariance | none cited | #1 - Staff development-curriculum writing process; classroom learning modules. Teachers from participating 4 schools in 6 staff development workshops; 17 weeks of student instruction. | Research project funded by three programs of the Texas Education Agency |
| same | same | Groups not accurately matched | #2 - Staff development activities for 6 teachers; 6 staff development days. Teachers oriented to CE and the infusion process...films and commercial materials used; site visit to observe an on-going program. | |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|

Study #1
Statistically significant results in subtests reading--vocabulary, language-mechanics and expression, and study skills- reference; also on total reading scores, total language scores and on total language scores and on total CTBS battery:

reading total = (P) .01
language " = (P) .01
comprehension = (P) NS
spelling = (P) NS
expression = (P) .001
reference = (P) .001
study skills = (P) .01
vocabulary = (P) .001
mechanics = (P) .001
graphics = (P) NS
total battery = (P) .001

Study #2
Even though pretest scores indicated that the groups were not matched, the pre- and posttest mean score differences recorded for the experimental group were higher and a statistically significant difference existed in one subtest:

| | Computation | | Application | | Concepts | | Total | |
|---|---|---|---|---|---|---|---|---|
| | X | Δ | X | | X | Δ | X | Δ |
| Experimental | | | | | | | | |
| Pre- | 21.4 | 9.2 | 8.5 | 2.1 | 14.6 | 3.0 | 44.5 | 14.4 |
| Post- | 30.6 | | 10.6 | | 17.6 | | 58.9 | |
| Control | | | | | | | | |
| Pre- | 26.3 | 7.4 | 10.4 | .5 | 16.8 | 2.1 | 53.5 | 9.9 |
| Post- | 33.7 | | 10.9 | | 18.9 | | 63.4 | |
| Significance Level | N.S. | | .01 | | N.S. | | N.S. | |

Study #1
Studies not conducted according to rigorous research designed criteria... however, primary emphasis placed on CE infusion techniques. Results reaffirm belief that CE can make a difference. Student achievement attributable to support provided and special efforts of teachers.

Study #2
Methodology for infusion...should help allay fears re. implementation. Students progressed at rate equal to or greater than those not utilizing CE in every academic area tested.

Not cited. However, the Director of Partners in Career Education is Dr. Elvis Arterbury.

STUDY

Career Education and Academic Achievement in the Elementary School. Partners in Career Education, 1201 North Watson Road, Arlington, Texas 76011. July, 1976.

5B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, language, mathematics, study skills | Kentucky: Educational Region XII | Pretest-Posttest design corresponding to Campbell and Stanley's Nonequivalent Control Group Design (#10) (1973-1974) | California Comprehensive Tests of Basic Skills | Approximately 1,300 students |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | .CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 4th, 8th, 11th | Analysis of covariance.. pretest scores were used as the covariate in the analysis in order to eliminate possible initial group differences. | Because of the short time period covered by the research project, it was not anticipated that many significant changes would be evidenced by students... basic skills take years to develop and/or modify. | /See description in Omvig's 1976 study./ | University based research project |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| 4th grade - When "group" was introduced as a main effect, no significant F-values were observed. In fact, most of the F-values were under 1.000.<br><br>8th grade - The same variable, when using "group" as a main effect, evidenced an F-value of 11.281, significant at the .001 level (i.e. math computation). A comparison of group means revealed that the higher adjusted posttest mean was earned by the CE group. Their mean of 8.40 was significantly higher than that of non-CE students (7.69). CE students learned at a relatively faster rate in making math computations.<br><br>11th grade - No significant F-value resulted...however, a comparison of the adjusted posttest means revealed...CE group slightly lower on math applications and slightly higher on study skill graphics. | As had been expected, academic achievement levels did not vary to any great extent between the groups....Recommendations: that student data be gathered over a longer period of time. | Clayton P. Omvig ('74) |

| | F-Value | | |
|---|---|---|---|
| F Value | 4th | 8th | 11th |
| reading vocab. = | 1.033 | 0.199 | 0.085 |
| compreh. = | 0.003 | 2.975 | 1.522 |
| lang. mechanics = | 0.009 | 0.696 | 0.234 |
| expression = | 0.422 | 0.080 | 1.357 |
| spelling = | 0.678 | 1.272 | 3.780 |
| math comp. = | 1.310 | 11.281* | 2.626 |
| concepts = | 0.392 | 0.527 | 3.044 |
| appl. = | 0.012 | 1.395 | 3.764 |
| total (8) = | 0.031 | 1.371 | 0.313 |
| study skills ref. = | 0.916 | 0.326 | 0.012 |
| graphics = | 1.104 | 0.693 | 3.660 |

(*.001 level)

STUDY

Effects of a Program of Career Education in Kentucky's Education Region XII. Dept. of Vocational Education. College of Education, University of Kentucky. Lexington, Kentucky 40506. November, 1974.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, language, arithmetic, study skills | Kentucky: Educational Region XII. (Southeastern counties; 8 independent school districts of Jackson, Jenkins, and Hazard) | Quasi-experimental design. Control group consisted of students in 1973-74 who were not exposed to CE; experimental group of those enrolled during 1975-76. | California Comprehensive Tests of Basic Skills | Approximately 120 per group per grade...total of 957 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| Sample groups of intact classes: 4th, 8th, 11th. | Analysis of variance to test for significance differences between sample groups; interaction and main effects of "sex" and "group" were analyzed (see below for "group" data). | Instead of gathering pretest and posttest data during the year, only posttest data were collected on the 1975-76 group. The 1974 control group data were utilized in the current analysis. | /Description of program (2/1/73 to 6/30/76) is detailed in The Career Educa- Program for Hazard Region XII by Owen Collins. Kentucky Valley Educational Cooperative, 325 Broadway, Hazard, Kentucky 41701. July, 1976./<br><br>Program emphasized during the 1st year career awareness in grades 1-12; exploration in grades 7-9 for the second year; work with grades 9-12 in preparation activities main focus of 3rd year. Five phases for each year: orientation, preparation, in-service, implementation, evaluation. | A report of a project funded through the State Bureau of Vocational Education's Resources Development Unit. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| 4th grade - When group was used as main effect, five significant differences were identified; in all cases the CE group had higher means. F-values were especially large in vocabulary and math computation. Perhaps of most significance was a significant difference on total score, a composite of eight reading, language, math subtests.<br><br>8th grade - two significant differences in favor of CE--reading comprehension and study skill/reference. CE group outscored control on all subscores except spelling.<br><br>11th grade - On the comparison of CE and non-CE groups, no significant F-values appeared.<br><br>Group effect: F-value and Prob.<br><br>4th 8th 11th<br>reading vocab. = 6.69 .01* 0.54 .53 0.22 .64<br>comprh. = 4.11 .04* 7.85 .01 0.82 .63<br>language mechan. = 0.31 .59 0.02 .89 3.14 .07<br>expression = 0.02 .87 1.19 .18 0.53 .53<br>spelling = 2.95 .08 0.03 .85 3.01 .08<br>math computation = 8.21 .00* 3.40 .06 2.04 .14<br>concepts = 0.94 .66 0.32 .58 0.79 .62<br>appl = 2.43 .12 2.90 .15 0.21 .64<br>total (8) = 4.30 .04* 2.22 .13 0.78 .62<br>study skills<br>ref. = 3.56 .06 3.96 .05* 0.50 .51<br>graphics = 4.51 .03* 2.54 .11 1.94 .17<br>(*P .05) | Overall, CE students tended to demonstrate higher achievement scores, only in a few cases (mostly 11th grade) did non-CE students consistently score higher. The scores were not significantly higher....It appeared that students out-performed non-CE students at lower levels. Perhaps the lack of differences at H.S. level attributed to fact that pattern of achievement had been well established prior to H.S. years. Also, program concentrated on lower grades.... It was more difficult to integrate CE in H.S. since not all students follow same curriculum....Therefore, differences in achievement at lower grades may really be a reflection of effect of different curriculum approaches. | Clayton P. Omvig ('76)<br><br>STUDY<br><br>The Effects of a Program of Career Education in Kentucky's Education Region XII: Phase II. Dept. of Vocational Education. College of Education, University of Kentucky. Lexington, Kentucky 40506. July. 1976. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Union County Schools, North Carolina | During 1st year it was not possible to use pre- posttest design. Data were collected in the spring only; results from 9/74 and 3/75 were available and were used...basic evaluation design, then, was based on treated and untreated comparisons. | California Achievement Test: Reading and Mathematics | Project / Control<br>3rd = 126 / 54<br>6th = 114 / 56<br>7th = 45 / 46<br>285 / 156 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd, 6th, 7th | One-way analysis of variance; regression analysis of various treatment variables against outcome scores. Scores expressed as grade equivalents. | none cited | Program activities: in-service at all grade levels, curriculum units integrating career information, group guidance, establishment of a career library. Also: 13 workshops conducted and 24 curriculum units developed. | Third-party evaluation reports of exemplary project in vocational education conducted under Part D, P.L. 90-576 by North Carolina State University. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| 6th grade achievement among students in project was greater than the achievement among the control sample in reading. There was a difference but not significant between the 6th grade means in arithmetic achievement in the March testing. In reading, the difference between the means for 6th grade in reading was significant at the .05 level.<br><br>mean grade equivalent<br><br>3rd reading: P = 2-9, C = 2-9, Diff. N.S.; March P = 3-8, C = 3-7, Diff. N.S.<br>math: P = 2-7, C = 2-6, Diff. N.S.; March P = 3-5, C = 3-5, Diff. N.S.<br>6th reading: P = 5-4, C = 5-4, Diff. N.S.; March P = 6-2, C = 5-4, Diff. P<.05<br>math: P = 5-2, C = 5-4, Diff. N.S.; March P = 6-1, C = 5-7, Diff. N.S.<br><br>7th grade: mean grade equivalents show the inequality of groups—with control group achievement higher. The two groups were not equal on these 2 measures:<br>reading: P = 5-4, C = 6-6, P<.05<br>math: P = 5-5, C = 6-3, P<.05<br><br>The evaluators believe that had pretest taken place, there would have been a significant difference in the beginning knowledge of the groups—with control higher.... | During the second year, the evaluators intend to add the dimension of pre-testing to evaluation procedures. | Walter L. Cox, Jr.<br>and<br>Barbara M. Parramore,<br><br>Co-directors, 3rd-party evaluation |

STUDY

Career Based Curriculum Project. First Year Interim Report. Dr. John Moore, Director. 7/1/74 - 6/30/75. Union County Schools. P.O. Box 499, Monroe, North Carolina 28810. July 15, 1975.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, math, language arts. | Union County Schools, North Carolina | Pretest and posttesting (fall and spring) | California Test Battery | 96 in project schools<br>78 in control |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd | Analysis of co-variance was used to adjust the observed differences of the interviewing variables... | none cited | Same overall activities as in previous year, plus 27 inservice workshops, expansion of career centers, further development and implementation of guidance activities, implementation of pilot programs all high schools, development of curriculum offerings for new Union County Career Center. | Third-party evaluation... North Carolina State University |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| No significant gains by Project students in reading...however, on math, language (with the exception of subtest on usage & structure), spelling, and total test battery, students had significantly higher mean percentile scores on posttest than pretest. Control group: although there were observable gains in the mean percentile scores on reading, the increases were not statistically significant as the result for Project students. The pattern of increases in other areas (except spelling) was similar to that of the Project students. Control students made significant gains in mean percentiles on math, language (except usage and structure) and total battery. Changes in spelling not statistically significant.<br><br>Comparisons: Project students' gains were significant on two subtests and total battery when compared to control: mechanics of language (.01)*, total language (.05)*, total test battery (.05)*:<br><br>F Value<br>vocabulary .05<br>comprehension .84<br>total reading .59<br>computation .59<br>concepts & problems 1.36<br>total math .12<br>mechanics, lang. 6.49*<br>use & structure .40<br>total lang. 4.97*<br>spelling 1.26<br>total battery 4.38* | none cited | Joseph R. Clary,<br>Walter L. Cox, Jr.,<br>and<br>Barbara M. Parramore |

STUDY

Career Based Curriculum Project. Second Year Interim Report. Dr. John D. Moore, Director, 7/1/75 - 6/30/76. Union County Schools. P.O. Box 499, Monroe, North Carolina 28810. July 15, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Philadelphia, Pa. | True experimental and control group design. Average time between pre- and posttesting was 8 months. | Stanford Reading and Mathematics Achievement Tests | Reading<br>CIP = 88<br>Controls = 55<br><br>Math<br>CIP = 86<br>Controls = 54 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| Senior high school- 10 to 12 | Analysis of covariance (data reported in Vol. II, Technical Appendix) | ...the findings are based on a design which has been said to be difficult to achieve in action research: a study involving 3 separate cohorts of applicants, with participants & non-participants chosen at random from the applicant pool. (However), the design contributes to believability in 2 ways: the replication of findings across 3 separate groups suggest that whatever is happening, is not a 1-time, 1-group event; the true experiment and control groups permit strong inference that whatever is happening is due to the internship, rather than to changes which would probably have occurred without OIC. | The urban CE Center Intern of the Opportunities Industrialization Centers of America, Inc., Philadelphia, Pa. (Dec. 1973 - Feb. 1976). It is made up of various components: Career Orientation Program (planning, guidance); Community Career Program (designed to help parents, esp. of interns, in community services) and the Career Intern Program (CIP--the internship phase).<br><br>Other aspects, the Career Development Plan, intern assessment, placement of interns, instruction/counseling, (cont'd.) | Research report prepared for the Opportunities Industrialization Centers of America, Inc., which designed and operates the Career Intern Program; supported by funds from the NIE. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| | | | | |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| | | | (cont'd.)<br><br>basic subjects in the curriculum, counseling seminar.<br><br>Academics: English, Social Studies, Math & Science relate senior high school subjects and CE content. (97 packets in each subject + 43 lessons in math), Hands-on experiences, electives | |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| (1) The interns have begun improvements that are statistically and educational significant.<br><br>(2) In reading, interns gained five academic months (7.2 average pre to 7.7 post) in an average of eight months in CIP. In mathematics, their gain was from 7.3 to 7.7. In comparison, the average scores of the control students did not change.<br><br>(3) Eighth grade reading level is about the minimum required for most skilled trades work. Before entering CIP, about 70% of the applicants were performing below this level. At post-testing, about 70% of the control students were still performing below this minimum. In contrast, in reading and mathematics, the CIP percentage below the minimum had dropped to about 58%.<br><br>(4) If the percent of students performing at less than the 6th grade level is considered, about twice as many controls as interns were performing at extremely low levels in mathematics at post-testing (30% controls; 13% interns). In reading, 34% of the controls and 27% of the interns were below 6th grade levels at post-testing.<br><br>(5) Controls were more likely to guess than interns. The raw scores do not contain a correction for guessing. If the correction is applied, the performance of interns on reading and mathematics again shows a reliable increase while the performance of controls decreases, a pattern consistent with the progressive decline in achievement reported for many low-income children who do not attend special programs. The correction for guessing has decreased control scores much more markedly for reading than for mathematics.<br><br>(6) The final levels achieved by both interns and controls are still far below the national averages. The average grade equivalent final scores on reading and mathematics for the interns was 7.7 and 7.7, respectively; for the controls, 7.0 and 6.9, respectively. Whatever the gains--and their were some substantial improvements--there is no blinking away the fact that many of the interns still have a lot of work to do before their basic skills reach levels offering much hope for postsecondary success in life, education and work.<br><br>(cont'd.) | ...Attending CIP leads to improvement in both mathematics and reading: a five months' gain in eight months' in reading and a four months' gain in mathematics compared to no gain in this time for controls. If the students can build on this start and continue to develop their skills, their post-CIP chances will be fairly bright. For about 40% of the interns, however, further remedial work will be necessary even to enter vocational/technical occupations. For about 85% of the interns, remedial work would be needed to reach 12th grade levels needed for regular work. | Richard A. Gibboney Associates, Inc.<br><br>STUDY<br><br>Career Intern Program: An Experiment in Career Education That Worked. Vol. I. Richard A. Gibboney Associates, Inc. 1777 Walton Road, Blue Bill, Pennsylvania 19422. (In press) April, 1977.<br><br>/See also: The Career Intern Program: Vol. I. Preliminary Results of an Experiment in Career Education. National Institute of Education. July, 1975./ |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|

(cont'd.)

Data was given to indicate the reading and math achievement of both groups. Analysis of covariance data was indicated for achievement scores with pretest covaried--and as follows: for achievement corrected for guessing scores with pretest covaried:

SOURCE OF VARIATION

| READING: | SS | df | MS | F | P |
|---|---|---|---|---|---|
| Pretest Covariate | 21,283.275 | 1 | 21,283.275 | 198.598 | .001 |
| Group | 1,023.523 | 1 | 1,023.523 | 9.551 | .01 |
| Cohort | 170.054 | 2 | 85.027 | .793 | |
| Group x Cohort | 104.153 | 2 | 52.076 | .486 | |
| Explained | 22,639.421 | 6 | 3,733.237 | 35.209 | .001 |
| Residual | 14,574.776 | 136 | 107.167 | | |
| Total | 37,214.197 | 142 | 262.072 | | |
| Regression | 884.266 | 5 | 176.853 | 1.692 | .10 |
| Residual | 13,690.510 | 131 | 104.508 | | |
| MATH: | | | | | |
| Pretest Covariate | 6,252.18155 | 1 | 6,252.18155 | 220.219 | <.01 |
| Group | 339.15108 | 1 | 339.15108 | 11.946 | <.01 |
| Cohort | 59.61919 | 2 | 29.809595 | 1.050 | |
| Group x Cohort | 118.78329 | 2 | 59.391645 | 2.092 | |
| Explained | 6,754.98325 | 6 | 1,125.83054 | 39.655 | <.01 |
| Residual | 3,775.96809 | 133 | 28.39074 | | |
| Total | 10,530.95134 | 139 | 75.76224 | | |
| Regression | 197.329 | 5 | 39.466 | 1.412 | >.10 |
| Residual | 3,578.639 | 128 | 27.958 | | |

STUDY

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, language arts, mathematics, (also social studies, science, & use of sources) | Kanawha County, West Virginia | Identification of two overall comparison groups | Iowa Test of Educational Development (ITED) and Educational Development Series (EDS) | EBCE-I = 45<br>EBCE-II = 45<br>EBCE-III = 5<br>(not included in analysis)<br><br>COOP students--approx. 70<br><br>RANDOM students = 120 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| EBCE-I - 12th<br>EBCE-II - 12th<br>EBCE-III - 11th<br><br>COOP - 11th & 12th<br>RANDOM - 12th | Multivariate analysis of variance; subsequently a univariate analysis of variance | none cited | EBCE program in existence for 2 years: 1st year developed and expanded the concept and developed innovative curriculum; 2nd year revised Instructional Delivery System. | Research sponsored by the National Institute of Education |

## FINDINGS

Re. hypothesis that EBCE students will do as well as comparison groups in scholastic growth (note: comparison groups were not given for ITED).

EDS: An F. value of 1.87 was found to be significant at $\leq .05$...significant differences between 3 groups (EBCE-I, COOP, RANDOM) on reading (F=3.62, Value .05), math (F=4.01, Value .05)

An F -value of 4.09 was found to be significant at $\leq .001$...significant growth of all groups combined was in reading (F=15.00, .01) and English (F=12.55, .01).

Analysis of the mean gain scores for each of the 6 subtests by group indicated no overall group differences; however...indicated differences between groups on English (F=4.63, .01) with COOP students showing greatest gains.

ITED: Analysis...overall EBCE students indicated significant growth in reading comprehension, lang. arts, math, and science. 11th grade EBCE students (N=5) demonstrated greatest overall growth.

| | | F | Value |
|---|---|---|---|
| reading | = | 10.65 | .01 |
| lang. arts | = | 4.20 | .05 |
| math | = | 5.17 | .05 |
| science | = | 3.33 | .10 |

Also case histories were conducted: 4 of 9 students improved substantially academically during EBCE; 5 others received "mixed ratings" from coordinators, parents, and themselves.

## CONCLUSIONS

EBCE program was judged very successful since it did successfully serve as an alternative educational program....

## RESEARCHER

J. A. Hilderbrand,
Charlotte Hollenberg,
and
J. H. Sanders

## STUDY

Final Evaluation Report.
Experience-Based Career Education
Appalachia Educational Laboratory,
Inc. P.O. Box 1348, Charleston,
West Virginia 25325.
September 30, 1974.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Kanawha County, West Virginia | Pretest-posttest | Comprehensive Tests of Basic Skills | EBCE:<br>$E_1$ = 51<br>$E_2$ = 22<br>$K_1$ = 16<br><br>Control:<br>$C_1$ = 30<br>$C_2$ = not cited |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| EBCE:<br>$E_1$ - 11th & 12th<br>$E_2$ - 12th<br>$K_1$ - 11th & 12th<br><br>Control:<br>$C_1$ - traditional H.S<br>$C_2$ - (unspecified) | Univariate analysis of variance; t-tests; analysis of variance | $E_2$, $C_2$, $K_1$ were not randomly selected and therefore were assumed to be non-equivalent to the other groups. | EBCE program in existence for over 3 years; 3rd year was spent in refinement of subsystems and materials. | Research sponsored by the National Institute of Education |

## FINDINGS

Comparison of academic achievement: no significant differences in academic achievement between true experimental group and true control. No other comparisons were made.

| | | F* | P |
|---|---|---|---|
| reading comprehension | = | 0.78 | 0.62 |
| arith. concepts | = | 1.09 | 0.30 |
| arith. applications | = | 0.56 | 0.54 |

F* .90 (1,9) = 2.78

Hypothesis: that $E_1$ will acquire increased mastery ($P<.10$) in basic academic skills. $E_1$ group did not show increased mastery:

| | reading comp. | arith. concepts & applications | |
|---|---|---|---|
| t-test | +0.40 | +0.72 | +0.92 |
| r | 0.72 | 0.81 | 0.82 |

(t.90(50)=1.30

Hypothesis: that $E_1$ would do as well in basic academic skills as $C_1$. $E_1$ did as well as $C_2$. It appears that there was little difference in the performance of these groups on the 3 subtests:

| | Pretest scores | | Posttest scores | |
|---|---|---|---|---|
| | F | P | F | P |
| reading comp. = | 0.78 | 0.62 | 0.69 | 0.59 |
| arith. concepts = | 1.09 | 0.30 | 0.39 | 0.54 |
| arith. applic. = | 0.56 | 0.54 | 1.27 | 0.26 |
| | F.90 (1,79)=2.78 | | F.90 (1,76)=2.78 | |

Hypothesis: that $K_1$ will acquire increased mastery in basic academic skills. $K_1$ (Charleston HS) students showed no significant ($p<.10$) gains as measured by 3 subtests.

| | reading comp. | arith. concepts & applications | |
|---|---|---|---|
| t-test | -1.42 | -0.45 | +0.77 |
| r | .64 | .65 | .63 |

(t.90 (15) = +1.34



## CONCLUSIONS

EBCE program was very successful since it did successfully serve as an alternative CE program.

## RESEARCHER

Joe E. Shively

## STUDY

FY '75 Internal Evaluation Report. Experience-Based Career Education. Applachia Educational Laboratory. Charleston, West Virginia. August 31, 1975.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Demonstration site--at AEL, West Virginia<br><br>Implementation--<br>Bremen, Georgia;<br>Crowley, Louisiana;<br>Ames, Iowa;<br>Staten Island, Ithaca,<br>and North Syracuse, New York. | Pretest-posttest | Comprehensive Tests of Basic Skills | AEL = 19 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 11th and 12th | Analysis of variance (ANOVA procedures) | none cited | EBCE program in existence for over 4 years; 4th year implementation of program. | Continuation of project on EBCE |

## FINDINGS

AEL/EBCE students showed no significant gains or losses on 3 subtests; maintained their mastery in basic academic skills.

| | reading comp. (RC) | arith. concepts (AC) | arith. applic. (AA) |
|---|---|---|---|
| F | 0.081 | 1.000 | .006 |
| P | >.25 | >.25 | >.25 |

A great deal of data was generated across the various sites. In summary:

| | | Sites (A to F unidentified) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | AEL | A | B | C | D | E | F |
| -RC | a | NS | NS | | 05+ | NS | NS | NS |
| | b | | NS | | | | 05- | NS |
| | c | | NS | | | | 10* | NS |
| | d | | NS | NS | | | 01* | NS |
| | e | | NS | | | | 05 | 10 |
| -AC | a | NS | NS | | NS | NS | NS | 05- |
| | b | | 10+ | | | | NS | 10+ |
| | c | | NS | | | | 10* | NS |
| | d | | 05** | 05** | | | NS | NS |
| | e | | NS | | | | 05 | 01 |
| -AA | a | NS | 10+ | | NS | NS | NS | |
| | b | | NS | | | | NS | |
| | c | | NS | | | | NS | |
| | d | | NS | 05** | | | NS | |
| | e | | NS | | | | NS | |

a = Experimental pre to post difference (gain +, loss -)
b = Comparison pre to post difference (gain +, loss -)
c = E vs C on pretests (* E>C, ** C>E)
d = E vs C on posttests (* E>C, ** C>E)
e = E vs C on change (absolutes)
NS = no significant difference
Blank spaces indicate data not available under design utilized; statistical analyses not conducted.

## CONCLUSIONS

...although the results were not similar across all sites, the evidence does favor EBCE. Consequently, implementation of EBCE as a viable alternative to the traditional secondary programs has been demonstrated.

## RESEARCHER

Joe E. Shively
and
Phyllis Kessel

## STUDY

Final Outcome Evaluation Report Demonstration and Implementation Sites. Experience-Based Career Education. Appalachia Educational Laboratory. Charleston, West Virginia. September 30, 1976.

13B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, mathematics, and written and oral communication | Tigard, Oregon | Pretest-posttest; experimental and control groups | Comprehensive Test of Basic Skills | True experimental group = 31<br><br>True control group = only 12 available for posttesting |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 11th and 12th | Step-down multivariate analysis of variance and covariance | Although the cost of using a control group was high and the number for whom data were obtained was small, the evaluators feel that the benefit gained from experimental design outweighed the costs. | EBCE: A comprehensive, individualized program integrating high school students' learning of Basic Skills, Life Skills, & Career Development through work & learning experiences in the community; "Community Experiences for Career Ed" $(CE)_2$; "hands-on" approach to learning; curriculum fully integrated; stress on adult activities; fully individualized. Students spent about ¼ time at learning center; remaining time at employer & community sites. (Fall of 1974 to Spring of 1975) | Research sponsored by the National Institute of Education |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| $(CE)_2$ students made statistically significant gains, especially in reading comprehension; they also made marginally significant gains ($.05 < p < .10$) in arithmetic concepts and application, but when conditioned for reading comprehension, these gains disappear. Conversion of expanded standard scores to grade equivalent scores indicates that during approximate 6-month period, $(CE)_2$ students gained 18 months in reading comp., 6 in arith. concepts and 5 in arith. applications. Also re. variability of change scores...a considerable number made negative changes...probably more indicative of test taking attitude than actual change in ability.<br><br>No significant differences in the adjusted mean posttest scores; supports hypothesis that $(CE)_2$ students would not gain less than comparable students.<br><br>/Note: Earlier NWL studies report in 1972-73 no statistically significant changes on CTBS; in 1973-74 students made statistically significant gains in all areas of CTBS except language mechanics. Bryant also reported this 1974 data: CE students scored a mean grade equivalent gain of .7 years; this compares to a decrease of .1 grade equivalent by comparison group./ | Results tend to support hypothesis that $(CE)_2$ students would make gains in Basic Skills and that control would not gain more. This is an encouraging if not impressive result, especially considering the fact that $(CE)_2$ is not a concentrated Basic Skills program. | Thomas Owens,<br>Joseph Haenn,<br>and<br>Harry Fehrenbacher |

| STUDY |
|---|
| Experience Based Career Education. Final Evaluation Report. FY 1975. Northwest Regional Educational Laboratory. 710 SW Second Avenue, Portland, Oregon 97204. September, 1975. |

14B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and math | Tigard, Oregon, plus 5 pilot sites: Hillsboro, Oregon; Colville, Washington; Billings, Montana; Kodiak, Alaska; Kennewick, Washington. | Pretest-posttest; experimental and control groups | Comprehensive Test of Basic Skills | Tigard = 14 to 17<br>Billings = 25<br>Colville = 20<br>Hillsboro = 55<br>Kennewick = 30<br>Kodiak = 30 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 11th and 12th<br>9th to 12th in Hillsboro | (same as in 1975) | none cited | Described in previous NWREL study for demonstration site.<br><br>Pilot sites:<br>Billings--many essential components of model;<br>Others--high degree of fidelity to model. | Research sponsored by the National Institute of Education |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| For the 14 (CE)$_2$ students in program for 2 years: 2 years growth in reading comprehension during 1st year and an additional year of growth during 2nd year. Marginal growth detected on arithmetic subtests. For the 17 1st year students and 14 2nd year students: average of 1 month's growth in reading comprehension per month of program and marginal growth on arithmetic subtests.<br><br>In pilot sites: while student growth on CTBS was generally positive, gains in reading comprehension were statistically significant for only 1 site. Educationally significant gains in reading comprehension (at least 1 month's growth per month...) were evident for 3 of 4 pilot sites and were evident on arithmetic concepts for 1 pilot site and arithmetic applications of 2 pilot sites. | No additional points cited in 1976 report. | Thomas R. Owens<br>and<br>Joseph F. Haenn |

| STUDY |
|---|
| Experience Based Career Education. Final Evaluation Report. FY 1976. Northwest Regional Educational Laboratory. 710 SW Second Avenue, Portland, Oregon 97204. September, 1976. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and Mathematics | Philadelphia, Pennsylvania | Pretest-post test; the overall design was quasi-experimental with non-equivalent control groups | Comprehensive Tests of Basic Skills | E(1) = 76 with no analogous comparison students<br><br>E(2) = 76 with a non-equivalent control group<br><br>/ Note: The table on CTBS scale scores refers to E(1)N=54 E(2)N=38 / |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 10th and 11th grades. No control group for 12th grade students so that comparisons at this level are not presented. | Correlated t-tests; analysis of covariance | The control group for the 10th and 11th grades was not equivalent in all respects but CE treatment to the experimental group. | A prototype EBCE program: site activities integrated with the rest of the curriculum; 3 main instructional components: career exploration and specialization, guidance, basic skills. Students spent at least 1 day a week in a variety of "hands-on" activities in participating industries, businesses, unions; structured small group guidance sessions each week; 1 1/2 hours each day on individualized learning in communication skills and mathematics (one year: 1973-74) | Part of an evaluation of RBS Career Education Program |

## FINDINGS

Results indicate hat only minima[l] support can be given to hypothesis that experimental students were superi[or] controls. The experimental means were always higher than control means, but only in the case of 1 subtest was the difference statistically significant (arithemtic applications: p .0016); the experimental group did not show any significant gains over the control group in the other basic skills subtests: reading vocabulary (p .4613) and comprehension (p .3658), arithmetic computation (p .2486) and concepts (p .8066)

CTBS Experimental Group Gains in Scale Scores (within group)

| | Posttest Mean - Pretest Mean | | t Value | |
|---|---|---|---|---|
| Reading | E1=54 | E2=38 | E1 | E2 |
| Vocabulary | 1.7593 | 29.3974 | 0.27084 | 2.92737* |
| Comprehension | 24.8704 | 12.0789 | 3.91746* | 1.66775* |
| Total | 17.4074 | 18.8684 | 3.72070* | 3.04251* |
| Arithmetic | | | | |
| Computation | 1.4444 | 29.0278 | 0.22314 | 3.42275* |
| Concepts | 13.0185 | 34.5000 | 1.63035* | 4.18474* |
| Applications | 41.2778 | 35.8611 | 5.62534* | 4.16555* |
| Total | 14.3333 | 34.4167 | 2.86718* | 5.07426* |

*$p < .10$ when $t \geq 1.31$ with $df \geq 30$

## CONCLUSIONS

Experimental students gained significantly in basic skills during project; basic skills gains of experimental students were higher but not significantly different.

## RESEARCHER

Keith M. Kershner and Mark W. Blair

## STUDY

Summative Evaluation of the Research for Better Schools Career Education Program. Research for Better Schools. 1700 Market Street, Philadelphia, Pennsylvania 19103. April, 1975.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Communications and mathematics skills | Philadelphia | A true experimental design achieved through the random assignment of applicants to experimental and control groups. | Comprehensive Tests of Basic Skills | E1=164<br>E2=30 (non-randomly selected returning group)<br>C1=66 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 11th and some from 9th, 10th, 12th | t-test for paired data using matched pretest and posttest scores; analyses of variance on the pretest scores with group membership as the independent variable. | None cited | Program utilizes self-paced learning resources, direct participation in vocational environments, classroom experiences, and adult-youth interpersonal interactions.... focus on individualization and community-based experiences. 3 principal components: Career Exploration and Specialization, Career Guidance, and Basic Skills. | An examination of effects of RBS Career Education Program |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Both 1st and 2nd year experimental students showed some significant growth over the year, but not in all areas tested....analyses did not indicate significant superiority of the E students in any test employed. Thus, the program was not demonstrated to offer advantages in the provision of basic skills instruction.<br><br>Within group: a significant growth indicated on 2 and 3 subtests (arithmetic concepts and applications)<br>("t" for E1 / E2)<br>Reading Comprehension — / 2.71<br>Arithmetic Concepts 2.73 / .71<br>Applications 3.33 / ---<br>($df \geq 30 = 1.310$)<br><br>Comparison: Analyses of data identified a significant grade difference in reading comprehension on both pre and posttest. The differences were consistent from pretest to posttest and reflect a possible grade linked development of reading comprehension. Only one other statistically significant finding was identified....a significant grade difference in pretest performance on the Arithmetic concept pretest. E groups did not out perform their control counterparts. | Recommendation #8. Any suspected problems related to basic skills presentation should be investigated, and a plan to solve them should be developed. | RBS: no single researcher cited (9/26/75)<br><br>STUDY<br><br>Career Education Program 1974-1975 Final Evaluation Report. Research for Better Schools. 1700 Market Street, Philadelphia, Pennsylvania 19103. September 26, 1975. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Communications and mathematics skills | Philadelphia (Students from the Academy for Career Education, implementation of RBS model) | A true experimental design achieved through random assignments of program applicants to experimental (E) and control (C) groups. During 1975-76, the design was maintained with students from the 1974-75 study of 1 year effects. | Comprehensive Tests of Basic Skills; Reading comprehension, arithmetic concepts and application | Cumulative effects - $E_1 = 63$ $C_1 = 32$ |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 10th 11th 12th | t-tests for paired data using matched pretest and posttest scores; analyses of variance or covariance, depending upon pretest findings; regression projection analyses. | None cited | 3 main instructional components: Career Development, Career Guidance and Basic Skills. Exploration courses are available for about 20 clusters of related careers; students participate each week for 1 1/2 hours in small group guidance sessions. The basic skills part operationalized as an Academic Resource Center and focuses on communications and math skills. | An examination of the effects of multiple year participation in RBS Career Education: a study of cumulative and second year effects. Funded in part by Vocational Education Act in cooperation with the NIE. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|

Cumulative Program Effects: Hypothesis that E students would acquire increased mastery in basic academic skills:

| | 1974 | 1976 | "t" |
|---|---|---|---|
| reading comp. - | 512.33 | 552.67 | 4.06* |
| arithmetic concepts - | 496.98 | 542.85 | 5.26* |
| arithmetic application - | 483.56 | 530.75 | 9.48* |

* Critical value for "t" = 1.310 when df $\geq$ 30 for 1 way "t" test.

...a significant within group growth-all 3 subtests; strong support for hypothesis.

Comparison of groups:

| | "t" |
|---|---|
| reading comp. - | 0.18 |
| arith. concepts - | 5.80* |
| arith. applications - | 6.96* |

...E group exhibited significantly higher growth rates when compared with performance projected from C group on 2 out of 3 subtests (in arithmetic.) There was no significant difference between groups in reading, although E group seemed to close an initial gap in performance means. Thus...some support that E students will acquire significantly greater mastery of basic skills than C students in a traditional program.

2nd year Program Effects: Hypothesis that E students would acquire increased mastery in basic academic skills:

| | 1975 | 1976 | "t" |
|---|---|---|---|
| reading comp. - | 508.64 | 549.18 | 3.01* |
| arithmetic concepts - | 520.74 | 542.79 | 2.67* |
| arithmetic application - | 503.00 | 532.43 | 3.57* |

...strong support for hypothesis that E students would acquire increased mastery during 2nd year.

Comparison of groups:

| | "t" |
|---|---|
| reading comp. - | 3.53* |
| arith. concepts - | -0.32 |
| arith. applications - | 9.87* |

...E group exhibited significantly increased growth rates on 2 out of 3 subtests. Thus...partial support that 2nd year E students will acquire significantly greater mastery in basic skills than C students in a traditional program.

Summary - 1974-76 (S= significant at .10)

| | Within - Group | | | Between - Groups | | |
|---|---|---|---|---|---|---|
| | 1 yr | 2nd yr | Cuml. | 1 yr | 2nd yr | cuml. |
| reading comp. - | NS | S | S | NS | S | NS |
| arith. concepts- | S | S | S | NS | NS | S |
| arith. applic. - | S | S | S | NS | S | S |

In conclusion, it has been demonstrated that students benefit from both 1 or 2 years of participation in RBS Career Education....

Thomas W. Biester

STUDY

Evaluation of Cumulative Effects of RBS Career Education. 1974-76. Research for Better Schools. 1700 Market Street, Philadelphia, 19103. August 31, 1976.

18B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Written communication, reading, quantitative skills | Oakland, California | Pre- and posttest experimental and control groups | Iowa Tests of Educational Development | FWS (students)<br><br>Writing = 34<br><br>Math and reading:<br>E = 12<br>C = 10 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 10th, 11th, 12th. | Analyses of covariance | Results of the reading test show that the groups differ in a number of ways, but these differences may be largely attributable to the effect of one atypical student in the control group. | FWL-EBCE prototype: a voluntary alternative program of comprehensiveness, individualized learning, focusing on direct experience in a variety of community settings....students pursue traditional academic subjects and develop basic skills through experiential learning. Activities include orientation, exploration, and investigation. | Research sponsored by the National Institute of Education (1973-74)<br><br>/Note: Data on basic academic skills was not reported by the FWL for 1975/ |

## FINDINGS

Written communication: On the basis of a writing sample judged for quality by independent raters, students showed a very significant increase in their knowledge of the mechanics, ability to communicate effectively, and maturity of written thoughts....students do improve their writing skills, but there is no reason to assume FWS is either more or less effective than comparison schools in this regard.

Reading: Results essentially parallel those for written communication. FWS students did improve skills but not significantly more or less than comparison students....FWS experience does not result in any disadvantage relative to students in more conventional high schools.

Quantitative skills: Results essentially the same as for the other skills. FWS student effects not significantly different from those obtained by comparison students.

| | Math | | | | Reading | | | |
|---|---|---|---|---|---|---|---|---|
| | Exp. | | Control | | Exp. | | Control | |
| | Nov. | May | Nov. | May | Nov. | May | Nov. | May |
| Mean | 9.4 | 10.1 | 8.9 | 9.1 | 10.0 | 10.4 | 8.8 | 10.2 |
| s.d. | 1.8 | 1.4 | 1.8 | 2.0 | 2.6 | 2.3 | 3.4 | 2.5 |
| correlation | .64 | | .74 | | .92 | | .48 | |

The experimental group had a greater average change in math...but difference is not significant. In reading, the control group changed more than did the experimental group.

## CONCLUSIONS

The learning of basic skills did not suffer through the elimination of classroom instruction: there was no significant difference in performance between the groups--this despite the fact that the remedial portion of the basic skills program was not fully in place until spring 1974. The primary emphasis of the program is on skills acquisition through field experience.

## RESEARCHER

Paul Christensen and others.

## STUDY

Experience-Based Career Education. Final Evaluation Report FY-1974. Volume 1. Far West Laboratory for Research and Development. 1855 Folsom Street., San Francisco, California 94103. 1974.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Unspecified | Henderson County, Kentucky | Pretest and posttests | California Comprehensive Tests of Basic Skills (total test battery scores for 6th grades coming through the 3 year program) | Cases: 1969 = 424<br>1971 = 466<br>1972 = 461<br>1973 = 449 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 6th graders progressing through program, therefore, 6th to 8th | Comparison to national norms | No control group was established...more concerned with average gain per year compared with national norms. | Program included: teacher made lesson plans and units, project group work, "hands on" activities, in-service teaching and workshops, use of community resources. | Evaluation phase of exemplary program - country level. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|

In all 3 years, average scores stayed somewhat below national norm. Yet, during 3rd year there was an appreciable gain of +14.7 points even though total battery score was still below national norms (514 compared to 544.)

| | grade equivalent | local gain | national gain | difference |
|---|---|---|---|---|
| fall '69 = | 5.0 | - | - | - |
| fall '71 = | 7.1 | 63.5 | 76.1 | -12.6 |
| fall '72 = | 7.7 | 11.8 | 20.2 | - 8.4 |
| spring '73 = | 8.6 | 45.6 | 30.9 | +14.7 |

...even though we cannot say the program gave a tremendous boost to the academic skills areas, on the other hand, there was no loss either. If the students... have realized the importance of some of their subjects...then they will be able to relate these to their own personal ambition in life. It has given, at least, a different reason for learning and going through school for some of the students.

Melvin P. Gibson, Project Director

STUDY

Career Education: A Thrust Forward. Henderson County Vocational Education Curriculum Integration Project: History Report. 7/1/70 - 6/30/73. Henderson County Public Schools. 1805 Second Street. Henderson, Kentucky 42420. 1973.

20B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Three school districts in Intermediate Unit #5, Pennsylvania | Pre-post testing; comparable control groups at each grade level | K (posttest only) = MacGinitie Gates Reading<br>2nd and 4th = Iowa Test of Basic Skills<br>9th = Stanford Achievement Test<br>10th = STEP-SCAT Achievement Test | exp. / control<br>K = 15 / 15<br>2 = 15 / 15<br>4 = 15 / 15<br>9 = 15 / 13<br>10 = 13 / 13<br>(73) / (71) |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| K, and, 4th, 9th, 10th | t-tests employed to determine if differences between groups were significant; t-test analysis of posttest scores. At 4th grade level, an analysis of covariance was utilized in relation to mathematics achievement to compensate for initial differences that existed in the groups. | ...limited amount of exposure time.... | Units on career awareness, exploration, and preparation... in an open entry-exit (flexible) career development program; exposure to range of career clusters; model computer resource curriculum; in-service training (5 workshops); individualizing the learning program. | Office of Career Education Grant: 7/1/75 to 6/30/76.<br>Grant #: G007502398 |

## FINDINGS

Minimal differences between the 2 groups was reported.

| K posttest mean raw scores: | | exp. | control | D.F. | t value |
|---|---|---|---|---|---|
| readiness | - mean | 87.87 | 85.93 | 28 | .4493 |
| | variance | 51.84 | 225.92 | | |
| | (not significant at .05 level of confidence) | | | | |
| **2nd grade** | | | | | |
| reading | - mean | 3.58 | 3.91 | 28 | 1.2314 |
| | variance | .544 | .555 | | |
| math | - mean | 3.04 | 3.10 | 28 | .2085 |
| | variance | .401 | .580 | | |
| | (not significant at .05 level of confidence) | | | | |
| **4th grade** | | | | | |
| reading | - mean | 5.75 | 5.17 | 28 | 1.5913 |
| | variance | .299 | 1.569 | | |
| | (not significant at .01 level of confidence) | | | | |

| | | S.S. | D.F. | M.S. | F |
|---|---|---|---|---|---|
| math | - treatments | .9239 | 1 | .9239 | 3.4060 |
| | error | 7.3454 | 27 | .2720 | |
| | total | 8.2693 | 28 | | |
| | (not significant at .05 level of confidence) | | | | |

| | | exp. | control | D.F. | t value |
|---|---|---|---|---|---|
| **9th grade** | | | | | |
| reading | - mean | 9.35 | 8.87 | 26 | .5636 |
| | variance | 4.43 | 5.75 | | |
| math | - mean | 8.44 | 8.54 | 26 | .0988 |
| | variance | 2.62 | 10.63 | | |
| | (not significant at .05 level of confidence) | | | | |
| **10th grade** | | | | | |
| reading | - mean | 441.538 | 450.154 | 24 | 1.5687 |
| | variance | 147.500 | 244.667 | | |
| math | - mean | 442.654 | 451.423 | 24 | 1.7172 |
| | variance | 172.917 | 166.083 | | |
| | (not significant at .05 level of confidence) | | | | |

## CONCLUSIONS

...in the limited amount of time during which the students were exposed to the project, the benefits of career education could not totally be assessed by the testing program. It should be emphasized that career education units did not provide specific provisions toward teaching subject areas in a direct fashion....also...all groups made gains in achievement but it was not possible to show that through the use of career units greater gains were made by the experimental group.

## RESEARCHER

David G. Minnis, Project Director

## STUDY

A Project To Demonstrate Incremental Improvements in a K-12 Career Education Program Through An Exemplary Model. Northwest Tri-County Intermediate Unit. 252 Waterford Street. Edinboro, Pennsylvania 16412. July, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Louisville, Kentucky<br><br>3 schools:<br><br>1 elementary<br>1 junior high school<br>1 senior high school | pre-and posttests | Stanford Achievement Test... administered to a sample of children in each school in January, 1976 and all students were tested as part of the systemwide achievement testing program in May, 1976. | See tables |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 2 to 11 | Initially it was planned to evaluate the achievement results by using regression equations to predict May scores, based on the previous year's data for the same children. However, it was decided to develop a new testing program in the merged Jefferson County District, so that the old regression equation would no longer be valid. Beginning in 1976-77, however, it will again be possible to do these regressions, since two years of Stanford data will be available. | None cited | Not given | Research project of county district |

## FINDINGS

Pre and posttest means for students who were pretested:

| GRADE | PRE-TEST | | POST-TEST | | GAIN | | NUMBER TESTED | |
|---|---|---|---|---|---|---|---|---|
| | Reading | Math | Reading | Math | Reading | Math | Reading | Math |
| 2 | 1.3 | - | 2.4 | - | 1.1 | - | 33 | - |
| 3 | 1.3 | 3.5 | 3.2 | 3.7 | 1.9 | .2 | 43 | 43 |
| 4 | 4.0 | 3.9 | 5.3 | 5.2 | 1.3 | 1.3 | 19 | 19 |
| 5 | 4.1 | 5.3 | 5.7 | 6.5 | 1.6 | 1.2 | 18 | 18 |
| 6 | 5.6 | 5.8 | 6.3 | 6.7 | .7 | .9 | 36 | 35 |
| 7 | 5.0 | 4.6 | 6.2 | 6.0 | 1.2 | 1.4 | 123 | 114 |
| 8 | 7.2 | 7.3 | 7.8 | 7.3 | .6 | 0 | 111 | 108 |
| 9 | 10 | 1 | 26 | 32 | 16 | 31 | 223 | 198 |
| 10 | 68 | 50 | 55 | 46 | -13 | -4 | 267 | 239 |
| 11 | 46 | 30 | 58 | 60 | 12 | 30 | 252 | 222 |

Grades 1-8 are in grade equivalents; 9-11 are in percentile ranks.



## CONCLUSIONS

Though the number of students tested was in some cases not very large, the general trend is quite obvious:

> There were sizeable gains in most grades, probably larger than would be expected in the short interval between the testing.

We lack sufficient information, not having baseline data or regression equations, to conclusively attribute the results to the program. However, the pattern of results is very consistent across schools and grades. Too, the process information gathered throughout the year gives strong evidence that the program was well implemented. We feel, therefore, that there is a strong probability that the CE program (perhaps in combination with other instructional programs in these schools) had an overall positive impact on both reading and mathematics achievement.

## RESEARCHER

Frank E. Rapley, Assistant Superintendent
Research and Evaluation

## STUDY

Achievement Test Results for the Career Education Program - 1975-76.
Jefferson County Public Schools.
675 River City Mall. Louisville, Kentucky 40202. 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Language and reading skills | Indiana | Pre-and posttest | Not specified | Not specified |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 8th and 9th | None utilized | The evaluation could not be expected to show significant changes in students since the main thrust of the program was to create teacher awareness. The focus was on teacher not student change. Students did not receive a concentrated exposure to CE during their year.<br><br>Result: the study revealed little difference between those who participated and those who did not in a model school experiment. | Project designed for 8th and 9th graders in an inner city... utilized teacher made workbook intended to increase reading comprehension level of students who were 4 or more years below grade level in basic skills of phonics, word recognition and comprehension. Workbooks used one full period each day; supplemented by 14 field trips during a year. | Evaluation project part of the overall program of Elkhart Career Education Planning - local level |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| Growth gains in language and reading skills that ranged from .6 to 3.3 years; average gain was 1.5 years. | The data collected can be used as a point of reference for later evaluations. | Richard P. Morrison, Program Director |

| STUDY |
| --- |
| Elkhart Career Center. What's In A Name? Elkhart Area Career Center. Elkhart, Indiana 46514. 1975. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Arithmetic | Stanford, Connecticut | Pre-test - posttest | Science Research Associates, Basic Skills in Arithmetic Test | 64 slow learners and disadvantaged youth |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 9th and 10th | Only grade equivalent scores cited | None cited | Correlated basic education: not intended for college bound students, included planned program of field trips, resources speakers, and vocational guidance; 4 occupational laboratory clusters to familiarize students with large variety of opportunities, promote proper usage of tools normally found in these occupations, encourage skill development. Clusters were: community services, construction, electro-mechanical, business machines. | A descriptive study of a career assessment program - local level |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| Students showed an average gain of 1.7 years (9th grade level) and 1.3 (10th grade level). The 9th grade gains ranged from 1.0 to 3.7 years; the 10th grade gains from .0 to 2.8 years.<br><br>A check of 5 students who were in the program the previous year and who were re-tested a year later indicated they maintained and improved their grade level scores. | Career Assessment has facilitated, reasonably well, better adjustment on the part of students to school and the improvement of basic skills. | Edward J. Lapinski,<br>Vocational Coordinator,<br>Stanford Public Schools |

| STUDY |
| --- |
| Career Assessment Program. Stanford High School Final Report. Vocational Education Research and Planning Unit. Connecticut State Department of Education. Hartford, Connecticut 06115. June 30, 1972. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| "Cognitive" | Newark, Delaware | Pretest - posttest design using treatment and non-equivalent comparison groups. | Career Education Cognitive Questionnaire | 21 in treatment;<br>23 in comparison |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| One intact 3rd grade | Analysis of difference in mean gain and posttest scores | None cited | Exposure to a CEIS curriculum unit over a six - week period | Evaluation component; part of 2nd annual report - local level. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Analysis of differences within groups...indicate that the difference is statistically significant at the P < .01 level:<br><br>mean gain scores / t-value<br>Treatment = 2.524 / 3.164*<br>Comparison = .696 / . 64<br><br>(* t significant at well beyond .01 level)<br><br>Analysis of differences in mean gain and posttest scores between groups, however, is not statistically significant:<br><br>Treatment = 2.525<br>Comparison = .696 > 1.358<br><br>mean posttest scores<br><br>Treatment = 31.048<br>Comparison = 29.044 > 1.367<br><br>Analysis also performed to determine relationship between membership in the treatment or comparison groups and mean posttest scores. The correlation was positive but not statisically significant:<br><br>N=44 Grade=3 Correlation=.202 | On the last item in the findings: However, if the strength and direction of the correlation holds with the larger number of cases in the final evaluation group, the relationships between mean posttest scores and exposure to treatment will be significant. /No other points were cited/. | Raymond G. Wasdyke<br><br>STUDY<br><br>Third-Party Annual Evaluation Report, Career Education Instructional System (CEIS) Project, Newark School District. Newark, Delaware. 1/1/75 through 12/31/75. Educational Testing Service, Princeton, New Jersey 08540. n.d. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| To determine whether one teacher's effectiveness improved after his adoption of a CE oriented approach as reflected in academic growth of students - for 1 year. | Maine | A pre-CE class was compared to a CE class. | SRA Achievement | Comparison (1972-73)= 24<br>CE (1973-74) = 23 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 6th | Scores expressed as growth (interval) scale, permitting use of parametric statistical techniques; t-test | none cited<br>/However, it is questionable whether it is proper to assume that "effectiveness" can be judged on the basis of academic growth of students/ | Curriculum infusion with a heavy emphasis on "hands-on" activities. | Evaluation of local CE project |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Differences between groups on the math and sources scales judged to be of no significance either from a statistical or practical point of view. In reading: the greater achievement of the CE group is significant at the .025 confidence level.<br><br>Reading / Math / Sources<br>Comparison: 17.62 / 39.83 / 32.54<br>CE: 33.56 / 37.26 / 33.39 | These results, therefore, indicate that the teacher's adoption of CE activities appears to have affected students' growth in reading achievement during the year they spent with him. | Roy Bagley |

STUDY

Career Education and Sixth-Crade Achievement. New Educational Directions. Box 307, Crawfordsville, Indiana 47933. October, 1975.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and math | Newark, New Jersery | Pretest-posttest | Metropolitan Achievement Test | 2-6-241 = reading;<br>237 = math<br><br>7&8-179 = reading;<br>189 = math |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 2-6<br>7th and 8th | To determine if the achievement score growth exceeded what would have occurred due to normal (non-program) instruction; pre-test scores were adjusted using the Bond Singer method developed by the New York State Education Department. T-test (paired data) | None cited | Technology for children: awareness in grades K-6: manipulative hands-on activities. Guest speakers and parents with a variety of occupations. Monthly workshops for program teachers and administrators: 18 parent workshops with a hands-on episode with related activities as they would occur in a classroom. At the junior high school level the program focused on Introduction to Vocations; students were provided with the opportunity for self assessments of their interests and abilities and were given opportunities to explore, experiment and conduct research in many career fields. | Office of Career Education Grant: 7/1/75 to 6/30/76 #007502350 Evaluation component conducted by Fred Streit Associates, July 1976. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|

Objective attainment was poor in reading and partial in math. The least progress is noted in grades 3 and 6. Grade 5 showed significant improvement in both reading and math.

Conclusion: that CE appears to have had no significant impact on increasing reading achievement test scores and varied impact by grade level in increasing math scores:

| Grade | Reading t-value | Reading objective attained | Math t-value | Math objective attained |
|---|---|---|---|---|
| 2 | 1.470 | No | 4.358 | Yes |
| 3 | -2.642 | No | -4.194 | No |
| 4 | -0.971 | No | 2.765 | Yes |
| 5 | 4.039 | Yes | 2.574 | Yes |
| 6 | 1.795 | No | -0.973 | No |

Data was also given for the 7th and 8th grade levels:

| Grade | Reading t-value | Reading significance | Math t-value | Math significance |
|---|---|---|---|---|
| 7 | -.33 | N.S. | -3.9 | - |
| 8 | -4.11 | - | -4.7 | - |

...math and reading achievement have not improved...a re-examination should be made of the anticipated results of such a program. Perhaps, attempting to achieve these results in one program year is not realistic.

Fred Streit

STUDY

Career Education Program. Annual Report 1975-76. Newark, New Jersey. 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Vocabulary and reading comprehension | Killeen, San Antonio, and Dallas, Texas | Pre-and posttests. Non-equivalent control group design since random assignment was not possible. | California Achievement Tests, Vocabulary and Comprehension<br><br>While this test does not provide normative data for Spanish - speaking adults, it provides standard scores and grade equivalent scores...in correlating reading materials to functioning levels of participants. | Total<br><br>HS Control = 20<br><br>GED Control = 20<br><br>/ See findings for number in treatment groups / |
| **GRADE LEVEL** | **STATISTICAL ANALYSIS** | **DELIMITATIONS** | **CE TREATMENT** | **TYPE OF STUDY** |
| Adults | Regression projection model | This design, while not providing the clarity of interpretation provided by a true experimental design, does provide control over such sources of invalidity as history, maturation, testing instrumentation, selection, and mortality. Although the design does limit generalizations, since external sources of invalidity are not controlled, such limitations are also common to its experimental design equivalent. | Career Orientation course: 15 individualized, competency-based modules on choosing, getting, and keeping a job. The basic skills of reading, writing, and math computation were integrated with these topical areas. 5 demonstration groups of Spanish - surnamed adults enrolled in 60 hours of instruction. In addition: The (Texas Telecomputer) Grid demonstration consisted of 42 hours of instructional and interact time. | Office of Career Education Grant: 7/1/75 to 6/30/76. Grant# G007503401 |

## FINDINGS

The Career Orientation course was found to enhance reading comprehension significantly in about 1/2 the instructional time used for a significant increase via a high school diploma or equivalency program.

Results of comparisons were less than definitive in that the high school diploma treatment group received twice as many hours of instructions as project treatment people.

Posttest Means and Standard Deviations
CAT: Standard Scores (Achievement Development)

| Demonstration | Vocabulary N | Vocabulary $\bar{x}$ | Vocabulary s | Reading Comp. N | Reading Comp. $\bar{x}$ | Reading Comp. s |
|---|---|---|---|---|---|---|
| Phase I | | | | | | |
| 1.2 | 5 | 470.8 | 45.77 | 5 | 498.2 | 54.64 |
| 1.3 | - | - | - | 5 | 482.3 | 49.92 |
| Phase II | | | | | | |
| 1.4 | - | - | - | 21 | 516.5 | 62.98 |
| 1.5 | - | - | - | 5 | 519.6 | 55.79 |
| Phase III | | | | | | |
| 1.6 | 14 | 512.8 | 83.55 | 14 | 522.4 | 100.44 |
| 2.1 | 13 | 532.9 | 54.9 | - | - | - |
| HS Control | - | - | - | 20 | 508.8 | 56.16 |
| GED Control | 20 | 530.2 | 37.51 | 20 | 543.4 | 44.32 |

The derived result of $t(23) = -3.243$ was significant at the .001 level, indicating that the use of the Grid resulted in significantly higher cognitive achievement than when instruction was presented without access to the Grid.

## CONCLUSIONS

Indication that the interface of relevant career subject matter with the basic skills was effective in reading the adult students.

The project studies did find that integrating occupationally relevant content and basic skills enhances and facilitates mastery of basic skills.

## RESEARCHER

T. C. Smith, Jr., Project Director

## STUDY

Final Project Performance Report: Texas Telecomputer Grid/Bilingual Career Education Demonstration Project. American Technological University. Highway 190 West, Killeen, Texas. 76541. June 30, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and math | New Haven, Connecticut (Troup Middle School) | City administered achievement tests | Metropolitan Achievement Test | Not clearly indicated, approximately 100 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 7th-8th (data on 8th) | Comparison of grade-level equivalence | None cited | A pilot CE program---included infusion, use of community resource personnel, group visitations, career cluster units (team taught.) | Local research project funded through Connecticut State Department of Education - Division of Vocational Education, Research and Planning Unit. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| Comparison of CE students at Troup with other Troup students...the average CE student scored higher than the average student at Troup (the second average based on all Troup students, including the higher-scoring CE students) on all nine test categories. The difference ranged from two months to six months in grade-level equivalence; in Total Reading it was four months (6.2 vs. 5.8), in Total Math two months (6.4 vs. 6.2). | While these gains are modest, they are consistent, and they support the other indicators of success... In any event, it is modest but steady gains such as these, rather than dramatic 'solutions', which hold the greatest hope for continued educational improvement.<br><br>[Note: These findings and conclusions were cited in correspondence from the coordinator of the Mayor's Task Force on Education to Mr. Gagliardi, 2/16/77.] | Vincent M. Gagliardi |

| STUDY |
| --- |
| Career Education Program - Troup Middle School. Final Report. New Haven Board of Education. 200 Orange Street, New Haven, Connecticut, 06510. July 1,1976. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Unspecified | Cobb County, Georgia (4 pilot schools) | Achievement test administration over the 3 year period | Iowa Test of Basic Skills | Not cited except that "3073 students in 115 classes were involved with project activities which represents all classes at each of the 4 schools". |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd, 4th and 6th | Comparison of mean composite scores | Unfortunately, the school system does not have achievement test scores on all its students, nor were they able to test a representative sample from each grade level within the program and control schools. | K-6: 3 year career development program...use of community resources and visitation of work sites. Units: hands-on activities, all subject tie-in, role playing, use of career development specialists. Numerous in-service meetings and workshops. Gradual expansion of project over the 3 years. | Exemplary project in vocational education conducted under Part D, P.L. 90-576 |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Results based only on the tests taken duri g the fall semester, 1972 (i.e., end of 2nd year)<br><br>3rd grade (compare to 3.1 at test period) average for 4 project schools: 3.35 & for 2 control schools: 3.35<br><br>4th grade (compare to 4.2 at test period) average for 4 project schools: 4.15 & for 2 control schools: 3.95<br><br>6th grade (compare to 6.2 at test period) average for 4 project schools: 6.0 & for 2 control schools: 5.8 | The information provided to the evaluation staff was insufficient for determining whether or not differences were significant. It is clear that the overall means for project schools were equal or higher.... For this reason it is concluded that the objective was partially attained. | Evaluation component: Douglas S. Katz and Robert L. Morgan<br><br>Joel Smith, Project Director |

STUDY

A Developmental Program of Occupational Education. Final Report, Cobb County Board of Education. 47 Waddell Street. Marietta, Georgia, 30062. 1970-1973.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading, spelling, math | Pittsburg, Kansas | pretest - posttest, experimental and control group (a 3rd and 6th grade of a parochial school which did not have career education.) | Metropolitan Achievement Tests (as part of regular evaluation program)<br><br>9 subtests (3rd grade)<br><br>11 Subtests (6th grade)<br><br>ABLE test, used in career math class (in which students explore ways math is related to occupations.) | 2nd year:<br>range : 203 - 235 in 3rd grade experimental<br><br>range : 231 - 264 in 6th grade experimental<br><br>64 in pretest, 54 in posttest in 9th grade<br><br>In control:<br><br>26 in 3rd<br><br>30 in 6th |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd<br>6th<br>9th | Chi-square procedure | See 3rd year Evaluation | Program activities: 1 - week institutes at two colleges, 1-week institute on system analysis for curriculum change, 1-day institute for all staff, consultants working with teachers, evening and weekend courses for staff, special workshops, career education components into curriculum, continued staff planning, begin development of printed curriculum guides.<br><br>Career Mathematics is a segment of career education. Resource persons who use math in occupations are used extensively (8th and 9th grades) | Evaluation component of the exemplary project in vocational education conducted under Part D of P.L. 90-576.<br><br>(2nd year evaluation 9/74 - 4/75) |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| 2nd year evaluation: 9/74 to 4/75<br><br>Posttest scores (3rd grade) showed a substantial gain over the pre-test scores in all 9 tests, a distribution of frequency...compiled and tested for significant differences: the difference in frequency significant at the .001 level on all 9 tests. Comparison between groups: no statistical difference between experimental and control.<br><br>6th grade data: In the tests for word knowledge and language, the distribution of scores was not statistically significant. The other nine tests were statistically significant at the .05 or higher level of confidence; 6 of the tests were significant at the .001 level (reading, spelling, math computation, problem solving, total math, science.) No significant differences between the experimental and control groups.<br><br>9th grade data: difference between pretest and posttest distribution of scores was significant at .001 level of confidence. | 2nd year ...the (program) has neither enhanced nor inhibited the traditional learning process at grades 3 or 6. There was substantial growth in all 9 areas shown by pre- and posttest in both grades. | David L. Huffman |
| | | **STUDY** |
| | | See 3rd year Evaluation |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| /_Same as indicated in 2nd year/ | -- | -- | -- | 3rd year:<br>range : 219-249 in 3rd grade experimental<br>range : 240-270 in 6th grade experimental<br>62 in pretest, 56 in posttest in 8th grade<br>In Control: 26 in 3rd<br>30 in 6th |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd<br>6th<br>8th | -- | re. 3rd year ---<br>...the selection of the Control Group, a Catholic school in Pittsburg, was not a valid selection as many of their teachers were involved in our in-service activities which did expose their students to many of the same concepts as those students in the public schools. Also, the excellent news coverage we have enjoyed also served to in-service many teachers in the area teaching in other school districts. This was good to promote career education, but very poor when it came to selecting a control group for proper evaluation.<br>/_In correspondence from David L. Huffman, Assist. Supt. and Career Education Director, 12/30/76/ | -- | -- |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| 3rd year evaluation: 9/74 to 3/76<br><br>Results of posttest scores in 3rd grade indicated a substantial gain ove. pretest scores in all 9 areas...statistically, the difference in frequency between pretest and posttest was significant at .005 level in all 9 areas; no statistical difference between experimental and control.<br><br>6th grade data: no statistical significance between scores of 2 groups. Results indicate substantial growth in all 11 areas.<br><br>8th grade data: career math program had positive effect on the performance of students. | re: 3rd year ---<br><br>...we could not show sifnificant difference from the control group, but we did show continued growth in achievement as should be expected and also have included many activities that promoted awareness, exploration and preparation including decision-making skills. / David L. Huffman, 12/30/76/ | David L. Huffman |

STUDY

A Consortium Approach to Exemplary Career Education Program Development Involving Two Unified School Districts and Two Teacher Education Institutions. Unified School District #250. Pittsburg, Kansas, 66762. June, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Determine whether teachers who use pre-designed, self-made conceptualized CE curriculum could effect significant academic improvement: Math<br>Science<br>English<br>Social Studies | Kansas | Pre and posttest | 4 subtests from advanced complete battery, Stanford Achievement Test | Experimental = 235<br><br>Control = 134 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 7th and 8th | 2 - way analysis of variance applied to pretest data. Posttest minus the pretest for each subject was examined using 2-way analysis of covariance on the difference score adjusted for the pre-test. | None cited | 20 teachers and administrators received 2 weeks of extensive in-service workshops (summer of 1974); in-service training once a month. CE curriculum models were designed. 9 months (74-75) implementing in actual classes. | Research by SED but no indication of where in the state it occured |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Result did not provide a significant F-ratio; no significant difference in math or English achievement.<br><br>Control vs. Treatment — F-ratio — Probability<br>Math concepts — 1.3 — NS - 0.258<br>Math computation — 0.4 — NS - 0.521<br>Math applications — 0.7 — NS - 0.410<br>Language — 6.07 — NS - 0.791<br><br>There existed a significant interaction effect re. social science in the 7th grade. Treatment population did significantly better than control: F-ratio: 4.3<br>Signf: 0.039<br><br>Significant differences between both 7th and 8th grade science treatment and control groups. Both treatment groups did significantly better:<br><br>F-ratio: 5.7<br>Signf.: 0.017 | ...pointed out that the 7th grade treatment group showed a higher adjusted mean difference score on all variables except math concept and both 7th and 8th treatment populations did show increase from pre to post tests. The CE treatment certainly was not debilitating...findings not too surprising when one considers the less experimental nature of (academic) disciplines vis-a-vis social science and science (which are more experimental and hands-on type of instruction)...these reasons account for the dichotomy of scores insofar as levels of significance...We feel that in a statistical as well as an academic sense, CE has proven to be a success in our experiment. | Gordon R. Schultz |

STUDY

The Relationship Between Conceptualized Curriculum for Career Education Teachers and (1) Vocational Maturity; (2) Academic Achievement In A Select Number of Disciplines for Seventh and Eight Grade Students. Office of Exemplary and Special Needs. Kansas State Department of Education. Topeka, Kansas, 66612. n. d.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| The basic skill objective: the minimum performance objectives developed by the Michigan Department of Education in the area of Math. | Calhoun County, Mason, Michigan | Pre- posttest | Locally developed instruments | Exp. - 3rd & 4th = 145<br>5th = 103<br><br>Control - 3rd & 4th =207<br>5th = 141 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 3rd, 4th and 5th | Comparison of pre-posttest means | A "validation process" to determine the potentiality of of integrating CE performance objectives with basic academic objectives in instruction. | The staff has 'experimented with various approaches and techniques to refine and enhance the service that was developed for the Calhoun County area.' | Report of county project |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| 5th grade - The contention asserted that academic achievement would not be impeded as a result of CE instruction...the experimental students performed at least as well...on the math section.<br><br>3rd and 4th grades - The multiplication section was too difficult for either group - with little or no change pre and post. For the other items (addition, angles, fractions, notation, points and lines, division) there was only slight differences...supporting the hypothesis that academic competence (measured by a math test) would not be impeded as a result of treatment. | 5th grade - Certainly, the integrated approach does not interfere with academic learning of students exposed to this kind of treatment. In some instances achievement may be enhanced by this approach....<br><br>3rd and 4th grades - Academic skills are not greatly enhanced by the integrated curriculum, but certainly the approach does not interfere with student learning. (However) not only can it provide the essential basic skills at the same level as traditional teaching, it delivers other information and knowledge that normally is not provided in the latter approach. | A. L. Simpson |

STUDY

An Assessment of The Effects of Integrated Curriculum on Students in Calhoun County. 1973-74. 611 Hagadorn Road, Mason, Michigan 48854. n.d.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | Dade County, Florida | Norm-reference results compared to results previously attained in 1974-75. Additional evaluations at junior high level 9th grade students who participated in career-related language arts were matched with those who did not participate (interms of reading achievement) | Elementary level: norm-referenced test of career awareness (but data was not given.) Also (1) Florida State Assessment of 9th grade reading skills were compared; (2) Florida 8th Grade Test used to compare results to other county schools and state-wide averages in language arts,math, and occupational information. | Pilot and comprehensive school career exploration students in 8th grade: reading = 2,158, math = 2,185. 9th grade: treatment and control groups = 294 each. |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 8th and 9th | Analysis of mean total score results | (1) the size of the sample... while not large /?/ are probably reliable. However, not all tests and not all schools were matrix-sampled (wherein each student receives only a portion of the test.) (2) With respect to the career-related language arts study: difficulty in matching pupils. (3) Problem of time required for proper implementation of a program. | Elementary school (career awareness) directed at providing relevancy to basic skills by showing practical application to job skills. Component: individual "hands-on" stations, materials, hardware, occupation's clothing...self-instructions learning activity packages. Junior high school: 8 career clusters, elective career exploratory lab courses..."try-on" experiences in various occupations. Career-related language arts and math as alternatives to traditional instruction: 8 language arts and 4 math career-related "quins" include individualized learning activity packages and related "hands-on" experiences. | Dade County evaluation project |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| Acquisition of reading skills somewhat higher for CE group. Florida Statewide Test results higher than county and state averages in math... Results of Florida 8th and 9th grade tests showed achievement in basic skills of math and reading (language arts) were being clearly but not spectacularly impacted by CE program. In math, the (junior high) schools not only surpassed average results in county but were higher than state average; the reading outcome was higher than county but lower than state average. | Based on current trends both elementary and junior high programs may be expected to produce...related achievement in the basic skills which will likely surpass state and national norms for many schools. | None cited (Report prepared by Dade County Department of Planning and Evaluation. |

STUDY

Evaluation of Dade County Public School Career Education Program, 1975-76. Department of Planning and Evaluation. Dade County Public Schools. 1410 N.E. Second Avenue, Miami, Florida. 33132. July, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| To establish experimental and control groups of student to test effectiveness of CE packages. | Erie County, New York | Experimental = sections taught by teachers who developed CEIS curriculum packages or who had training in their use; control = no prior training in use or development of packages....<br><br>Pre-and posttest CEIS instruments. | The criterion - referenced CEIS instruments - written to match objectives in CE packages. | Varied from grade to grade, but usually less than 10 in experimental and control. |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| Varied as to test; included K-12 overall. | T-test for independent samples were used to measure achievement differences. | (Listed under conclusions) | Not indicated as such. /Note: However, another source (CEIS Three Year Project Summary--- same address as Phase III study) indicated that 100 teachers, counselors, administrators and media specialists were oriented and trained to prepare curriculum packages in language arts, math, science, and social science at all grade levels. 52 Learning Activity packets were prepared. Following summer orientation, 300 teachers used them in their classrooms./ | Field testing of curriculum materials designed to infuse concepts into the normal academic curriculum - local level. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| While extensive treatment effects could not be demonstrated, both groups showed achievement gain, almost without exception, between pre-and post-tests. Furthermore, in almost 2/3 (61.3%) of the cases, the t-tests which were performed were statistically significant.<br><br>/Note: Bryant[3] reported the following data from the 1st year of the project: pre-post testing indicated slight gains in 28 test cells (grade level-subject) for which data were obtained; 2 cases were statistically significant in achievement gains during the 1st year of field testing. During the 1974-75 year, examination of the pre-post testing indicated increases in achievement in all but 5 of the 64 test cells. In 16 cases the gains, experimental over control, were statistically significant./ | The failure to produce an extensive statistically significant achievement differential...can result from a variety of factors: the statistical phenomenon of regression, failure to match treatment groups on all relevant variables, and ceiling effects...impossible to produce a truly equivalent control group design due to lack of complete matching. | Malcolm Conway, External Evaluator<br><br>James R. Spengler, Project Director |

| STUDY |
|---|
| Career Education Instructional System. Phase III. Final Report. 1974-75. Board of Cooperative Educational Services. First Supervisory District. Erie County. 455 Cayuga Rd., Cheektowaga, N.Y., 14225. July 11, 1975. |

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and mathematics | West Virginia | Pre-and posttest | Metropolitan Achievement Tests | Experimental = 20<br>Control = 20 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 4th and 5th | t-test | A field study: lack of control of the experimental situation | One group (experimental)had been enrolled in a CE program for 3 years.<br>/Note: not much information was presented other than it was established that a week of in-service training preceeded monthly after-school planning and implementation of CE units./ | Doctoral dissertation |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| No statistically significant differences between the groups in level of reading achievement in grades 4 (t.22), 5(t.32), or between school comparisons or in math achievement between the 2 fourth grades (t.08), the 2 fifth grades (t.18) or between schools (t.15) comparisons. | ...the conclusion would be that there are severe limitations on the choice of measuring devices for career development; and since our knowledge of career development is limited at the present time, an adequate evaluation of CE or career development is not possible. | Stephen S. Feit |

| STUDY |
| --- |
| Career Education and Its Impact on Academic Achievement and Career Development. Unpublished Ed. D. dissertation. West Virginia University. Morgantown, West Virginia. 1973. |

C6B

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Reading and math | Region 10<br>Education Service Center<br>Richardson, Texas<br><br>(4 local districts) | Pre-and post-measures | Comprehensive Test of Basic Skills | Reading = 449<br>Math = 409 |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| It apparently varied from K to 12 | Control groups not used... however, a technique whereby each student served as his/her own control was employed...a Pre-Intervention Growth Date for each student was calculated and later used as baseline data.... | The intervention period during which student instruction was provided was limited to a maximum of 12 weeks. | Phasing in CE Systematically Project: specific instructional planning based on 2 data centered systems (sequencing and needs assessment.)<br><br>Two phases: preparation and instructional application. The former included orientation, sequencing learner outcomes, needs assessment, and instruction planning; the latter included instruction in operation, follow-up consultative assistance, and reporting. | Office of Career Education<br>Grant: 7/1/75 to 6/30/76<br>Grant#G007503740 |

| FINDINGS | CONCLUSIONS | RESEARCHER |
|---|---|---|
| The $X^2$ value resulting from the analyses was found to be below the value required for significance at the .05 level. However, it was noted that more students had negative signs than had positive signs.<br><br>Effect on student growth rates:<br><br>Reading -<br><br>Positive / Negative / $X^2$<br>Expected 224.5 / 224.5 / 3.764<br>Observed 218 / 231<br><br>Math -<br><br>Positive / Negative / $X^2$<br>Expected 204.5 / 204.5 / 3.719<br>Observed 224 / 185<br><br>However, in math, out of the 409 students tested, 39 more positive than negative signs were observed. | The impact of the project in terms of producing significant cognitive...gains among...students was found to be negligable. [sic] | Gwyn Brownlee, Project Director |

STUDY

Phasing in Career Education Systematically. Region 10. Education Service Center. Richardson, Texas. September, 1976.

| SUBJECT AREA | LOCATION | RESEARCH DESIGN | INSTRUMENTS | SIZE OF SAMPLE |
|---|---|---|---|---|
| Summative evaluation on student achievement | Minnesota (7 projects evaluated) | Experimental and control groups | Specially developed tests...to assess impact of CE on cognitive achievements. | 8048 defined as experimental, 2853 as control |

| GRADE LEVEL | STATISTICAL ANALYSIS | DELIMITATIONS | CE TREATMENT | TYPE OF STUDY |
|---|---|---|---|---|
| 1st to 9th | Descriptive statistics; frequency, means, standard deviations, Hoyt's reliability coefficient, percentages. | Two types: The way in which populations were identified and test validity and reliability. The tests were equally reliable for both groups but the 4-6 and 7-9 tests were more reliable than the 1-3 test. | Not specified other than that it dealt with awareness (K-3), awareness and orientation (4-6), and exploration (7-9).<br><br>/Note: Implication that activities included inservice training, use of different curriculum or institution materials, and guidance services./ | Final report of the exemplary programs... funded under Part C of Vocational Education Amendments of 1968. |

| FINDINGS | CONCLUSIONS | RESEARCHER |
| --- | --- | --- |
| Differences in student achievement were detected for experimental and control groups, but these difference were small and not always in favor of the experimental groups.<br><br>Students in experimental project tended to have slightly higher mean scores on 1-3 and 4-6 tests; students in control groups tended to have higher mean score on 7-9 test. Differences for 1-3 test quite small; considerably larger for 4-6 and 7-9 tests.<br><br>Data suggest a trend for experimental students to score higher on 1-3 test: 6% of comparisons were in favor of experimental groups. In the 4-6 test: only 48% of comparisons favored experimental groups.<br><br>Data not presented for 7-9 test because of limited number of comparisons. | It seems safe to conclude that the impact was minimal.<br><br>Four explanations: possibility tests did not adequately sample the content emphasized by teachers in exemplary projects; teachers in control schools had perhaps been teaching CE concepts; inadequate amount of instructional emphasis and time (1 1/2 hrs. per week); one year of CE instruction may be insufficient. | Brandon B. Smith |

| STUDY |
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| A System For Evaluating Career Education in Minnesota: 1972-73. Minnesota Research Coordinating Unit for Vocational Education. University of Minnesota. Minneapolis, Minnesota. 55455. January, 1974. |

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